A REVISION OF SOME SPECIES OF NOCTUIDÆ HERETOFORE REFERRED TO THE GENUS HOMOPTERA BOISDUVAL

BY

JOHN B. SMITH

Of Rutgers College, New Brunswick, New Jersey

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A REVISION OF SOME SPECIES OF NOCTUIDÆ HERETOFORE REFERRED TO THE GENUS HOMOPTERA BOISDUVAL.

By JOHN B. SMITH,
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The species of *Homoptera* Boisduval, as they have been listed in our fauna, are typified by the most common and best known of our species, *lunata*, or *edusa*, as it has been indifferently known. As based on that species the genus has naked, hemispherical eyes, a smooth moderately convex front clothed with scaly vestiture, which is divergent, not smooth nor closely applied. The antennæ are long, a little thicker in the male, in which the joints are also a little marked and furnished with lateral ciliæ. The tongue is well developed and functional. The palpi are long, curved obliquely upward, closely scaled, third joint almost as long as the second but more slender, more closely scaled and usually truncate at tip. There is a little difference in the sexes and more between the different species; but on the whole the general character of the palpal structure is distinctive and much the same throughout.

The thorax is not large in proportion to the size of the insects, quadrate or nearly so, the vestiture consisting of long flattened hair with broader scales intermixed, thick but smoothly applied. The collar is round and closely applied. Patagia always well marked and sometimes conspicuously developed. They may be flattened and divergent into wing-like structures posteriorly, or they may be uplifted so as to form a brush-like mass; but they are always at least well marked and divergent. Between the patagia there is usually a posterior tuft which is generally truncated behind and may overhang the basal segment of the abdomen. The abdomen is cylindrical, stout, extending to or exceeding anal angle of secondaries; closely scaled, with a variably developed series of dorsal tufts. Usually there is a broad tuft on the basal segment, supplementing that on the thorax and like it cut off square behind; the others are as a rule little upright scale masses that are easily removed and are rarely complete in captured specimens. Not infrequently one or the other of these dorsal

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tufts is more prominent than any other and gives that species a characteristic appearance.

The legs are always stout and well developed, the anterior always, the posterior usually without spinules or other than the normal armature. Middle tibiæ always spinose, the spines varying somewhat in number and prominence even within the limits of the same species.

In examining some of the mounts of legs made in the course of the preliminary work with *lunata*, I noted quite a difference in the amount and character of the spinulation of the middle tibia and I noted also that occasionally, on the hind tibiæ, there would be one or two distinct spinules between the two pairs of spurs. As this spinulation is a structural character that has been given much systematic value, it became important to determine whether there was not, perhaps, a mixture of species and whether by separating out those with the spines present on the posterior tibiæ, it would not be possible to correlate the structure with some superficial character. Every example in all the collections then in my hands was therefore carefully examined with the following results:

The Ottolengui collection contained 21 males and 15 females, and of the males 7 had the blue lunules distinct while 14 were of the type in which the blue was reduced to narrow lines. Of the 7 males in which the blue lunules were well developed, 2 had distinct spines on the hind tibiæ. Of the 14 males in which there were no blue lunules, not one had any trace of such spinules. Of the 15 females, 7, or nearly one-half, had distinct spinules on the posterior tibiæ. In the females there was no sort of correspondence between the depth of coloration and the presence of the spinules, and in the males the percentage of spinose examples, 2 out of 21, was so small that no rule could be even hinted at.

In the collection of the U. S. National Museum there were 53 males and 43 females, and of the 53 males there were 25 with distinct blue lunules and 28 in which the blue was reduced to lines. Of the males, 5 of those with blue lunules and 6 of those with blue lines only had the posterior tibiæ spinulated. Of the females, 16 out of the 43 had that character well developed.

In my own collection I had 25 males and 33 females, and of the males 10 had the blue lunules distinct, while 15 had only the blue lines. Only one example with blue lunules had any trace of spines on the hind tibiæ. In the females, however, 13 out of the 33 examples had one or two distinct spinules between the two pairs of spurs. The females were separated out into two series; those with the median space distinctly paler and those with the surface concolorous, and 3 of the spined specimens were ranged among the former and 10 came into the latter series.

Altogether I examined 99 males and 91 females and found 14 males and 36 females with spines on the posterior tibiæ. I found no sort of relation between locality, date, color, sex, or maculation and the presence or absence of spines, and the only thing that could be said was that the spines on the posterior tibiæ were more commonly present in the female than in the male.

No other species was so systematically and fully examined as *lunata*, but in almost every species where a number of examples were looked at, this same variation in the presence of spines on the posterior tibia was observed. It is not in this series of species a character of even specific value.

In the male the typical species has the middle femora a little enlarged, inwardly grooved, laterally fringed with hair of variable length and density, forming receptacles which contain masses of specialized scales, sometimes in enormous, sometimes in small quantity only. But not all the species referred here are so characterized, and some of them have no trace of this sexual character.

When the insect has the legs normally held against the breast little is noticeable of this tuft even when it is well developed; but when the leg is removed and the tuft is stirred with a needle, it forms a mass several times as great as the original. The tibia has a small tuft of hair which is not specialized or formed into a definite pencil. In the female there is a fringe of hair to the femur; but it is much smaller than in the male, and there is no contained mass of specialized hair.

The wings are broadly trigonate and in a general way the secondaries are ornamented much like the primaries. The apex of the primary is distinct or even acute, and the outer margin is more or less dentate or scalloped, this being a variable feature. There is nothing very characteristic about the venation. In the primaries 6 is from the lower margin of accessory cell, 7 and 8 + 9 are from its end, and 10 is from its upper margin near the tip. On the secondaries the median cell is very short, 3 + 4 fork at the end of the median, and 5 is from a short oblique spur, parallel with and quite as strong as 4.

As thus characterized, *Ypsia* Guenée does not differ very markedly from *Homoptera* Boisduval, and I have united the species referred to the latter genus with those treated here. The thoracic tufting is not so well marked and the patagia are not so divergent; otherwise I find nothing that is of especial importance. The structural details are exactly the same and so are the sexual characters, which will be referred to in more detail presently.

Phœocyma Hübner, as based on *lunifera* Hübner, is an earlier name for the same conception, and except for the fact that we have a somewhat more slightly built species, there is no structural differ-

ence. Hübner's name is the one that must be used for the conception above described, including those species in which the middle femora of the male have the mass of specialized scales normally developed. The species referred to *Phœocyma* by Mr. Grote do not belong there.

Zale Hübner is a still earlier name for almost the same conception, structurally speaking, but this offers greater differences in certain directions.

Based on our species *horrida*, the more divergent thoracic tufts, emphasized because discolorous, and the more conspicuous dorsal tufts of the abdomen make the genus recognizable; but these differences are only of degree and scarcely greater than occur elsewhere in the series of species. In the male the middle femora have no mass of specialized scales, and as there is quite a little series of species that agree in this character or lack of character, I propose to hold *Zale* Hübner in a subgeneric sense as applicable to those species of *Phœocyma* in which the middle femora of the male are not in any way modified.

As they appeared in collections when I began, the species of *Homoptera* were considerably mixed up, and except for a few of the better marked species names were doubtful. Under *calycanthata* at least three distinct species were masquerading and neither of them was the form described by Smith and Abbot. Morrison's species were rarely identified at all, and as a rule erroneously when any attempt had been made to name them. *Lunifera* Hübner and *squammularis* Drury were not correctly identified, and as a whole the straightening out of the synonymy was the first and not least interesting portion of the task before me.

My own material was in no better shape than any other, and for some years I had refused to apply names to species of this genus except in a tentative way. Some years ago Dr. R. Ottolengui had begun the accumulation of material with the view of monographing the species, but press of other work caused the abandonment of this intention. He was good enough to turn all his specimens over to me, and this furnished the greatest variety of species in any one collection.

From the U. S. National Museum I secured their entire North American series through the courtesy of the Curator, Dr. L. O. Howard, and this was rich in examples from Texas and some other portions of the South and Southwest. Some material of Doctor Dyar's collecting in the Kootenai district was interesting in this connection, and was supplemented by a very nice series of examples received from Mr. William J. Cockle through Dr. James Fletcher, who also sent me a number of other examples for examination and study.

Dr. William Barnes was as usual ready with his material which aided materially in completing certain series, and Mr. Otto Buchholz was good enough to let me have a remarkable series of examples taken by him in Yavapai County, Arizona.

In addition, I have had quite a number of smaller collections from other collectors and correspondents, all of which aided in fixing the range of variation and distribution of the species, and to all of these correspondents I owe thanks for their courtesy.

Not the least valuable little lot of specimens was received from the Rev. Dr. C. J. S. Bethune, who was the pioneer American worker in this genus and whose paper in the Canadian Journal was a real help to me.

Finally, I owe thanks to Dr. H. G. Dyar for courtesies extended to me in Washington, where I compared my determinations of some of the southern intruders into our fauna, with the material in the Schaus collection.

One of the interesting features that developed in the study of these species is the remarkable asymmetry in the sexual structures of both males and females of some of the species and the strong characters that were found in the females, which, in the Noctuids, generally lack all structural peculiarities.

In the males the asymmetry is between the harpes of the two sides, which in extreme cases are totally dissimilar, with processes on one side for which there is no counterpart on the other, and which are rarely entirely alike. The sheath of the penis or intromittent organ is always more or less curved or bent, or even hooked, and this structure is directly correlated to the differences found in the female.

In all save a very few, the seventh abdominal segment of the females is more or less modified both above and below. In the descriptions the term anal segment or last segment is sometimes used in referring to this structure; but what is meant is this apparent seventh segment counting from the base, or the penultimate, counting from the terminal points bearing the minute cerci.

Seen from above, the abdomen of the female of most species seems to narrow very abruptly, and at the sides of the base of this segment there are distinct depressions or grooves, often a little discolored or with little tufts of discolorous hair. On the under side this segment is apparently lobed or divided, and when denuded it is found that these lobes are chitinous, that they are usually dissimilar in size and outline, and that somewhere along the right side there is a distinct opening to the *bursa copulatrix* or copulating pouch.

It might be explained here that in describing these structures those of the males are figured and described as if seen in position from the upper side, the head of the insect being nearest the eye. The females, on the other hand, are described and figured as if the specimen were

held bottom up, the tip of the abdomen nearest the eye. The range of variation in these structures is better shown in the figures and in the discussions under individual species.

It has been already indicated that there are two groups, based on the character of the middle femora of the male, and the difference is absolute. There is no case where there is any question of amount. The mass of specialized scales is either definitely present, *Phæocyma verae*, or definitely absent, series *Zale*.

Among the *Phæocyma* the first series separable on superficial characters comprises three species which constitutes a foreign element in our fauna. They are all large forms, resembling the *lunata* type in a general way, and always distinguishable by having the t. p. line narrow, single, and outwardly denticulate in the interspaces. None others of our species have this sort of t. p. line, while it is a common feature in the subtropical and tropical species, from which these are intruders into our fauna.

In addition, there is a tendency to flatten the thoracic tuftings posteriorly and to expand them laterally, somewhat wing-like. The basal tuft of the abdominal series is much flattened, squarely cut off behind and extends across the entire segment like a little fan. In all of them the femoral tufting of the male is well developed and the mass of specialized scales is enormous.

I have made no attempt to relate these species to the others in the fauna to which they really belong, because I had neither the material nor the literature for the task. I have simply identified them specifically, and have described them so as to be recognizable whenever they are taken in our fauna. They are easily enough distinguished.

Exhausta Guenee is a somewhat short winged species, with a dark base and dark brown costal patch between t. p. and s. t. lines. It runs to light colors, especially in the male, which is sometimes creamy gray, ranging from that to leaf-brown. On the secondaries the bluish area beyond the extra median lines tends to become almost ocellate in character. It has been taken in Florida only.

Fictilis Guenée is a very even species, without contrasts; gray brown in the male, darker more strigillate in the female. The best defined marking is on the secondaries, where the extra-median black lines are close together and tend to form a band, the outer margin of which is dentate toward the costal margin.

Viridans is the largest species and most resembles the normal *lunata* type; but in the male it is distinguished from all our other species in having the disc of secondaries beneath, densely clothed with long, silky hair. In the females the wings are a mass of transverse strigillations, more or less intermingled with greenish or bluish scales.

In all these species the underside is yellowish and crossed by numerous transverse lines and strigillations, forming no distinctly localized

shades or bands. So far as genitalic structure is concerned, there is no near agreement between the species in either sex; but in the female the tendency is to symmetry, to a complete plate inferiorly, with the opening to the *bursa copulatrix* posteriorly, or at about the usual point of the anal opening. Correspondingly in the male, the structures are quite similar on the two sides, and the intromittent organ is only a little curved.

The next series of specimens may be strictly typified by *lunata* so far as character of maculation is concerned. The t. a. line is usually geminate, very oblique inwardly, with a slight outward arquation, but without teeth or angles. There are usually two or three, more or less waved or sinuate oblique lines on the disc; the t. p. line is usually distinct, often geminate, never with outward denticulations in the interspaces. On the secondaries the type of maculation is similar to that on the primaries, and particularly the terminal area is practically the same on both wings.

Lunata, *salicis*, and *edusina* are distinct from all the others in the series in not having the seventh segment of the female distinctly lobed beneath. In *lunata* the segment is complete but asymmetrical, and the opening to the *bursa* is at the extreme right of the segment, protected by a cercus-like process. There is no modification of the upper part of the segment and there are no lateral depressions. The males have the harpes wildly asymmetrical and the intromittent organ is strongly hooked and twisted. This is the largest of our common species and in the male tends to form two blue terminal lunate areas on primaries and one on secondaries.

Salicis is the Pacific coast representative of the eastern *lunata*. It is a little smaller, a little more uniform in ornamentation, and has a number of other slight habital peculiarities that are not easily described. In genital structure it is very like its eastern relative, so that, in fact, it becomes a matter of detail rather than of type of structure.

Edusina is a greatly reduced *lunata*, and resembles the *Zale* series in appearance if not in structure. It comes from Texas and parts of Arizona, and is of a dull ashen gray color without brilliant or striking contrasts of any kind. In the male the sexual structures are not unlike those of *lunata* in general type, though differing much in detail; but in the female the seventh segment beneath is broken up into a number of chitinous fragments, which border but do not outline the opening to the copulatory pouch. This is one of the smallest of our species and not often mistaken in collections.

All the rest of the species of this series have the seventh segment of the female distinctly lobed beneath, and laterally at the anterior angles above, the depressions are very distinct.

Undularis is very dark smoky, almost black, with velvety black lines and the s. t. line is broken by white scales opposite the cell. There is none other like it, and recognition should be easy. It is one of the species that was referred to *Ypsia* Guenée.

The variety *umbripennis* differs from the type in that the median area below cell is a little paler, more brown in color, and over the line of the s. t. line from the inner margin toward the middle there is a somewhat violaceous shading. The white interruption to the s. t. line tends to become lost in the variety.

Æruginosa, which has also been placed as a variety of *undularis*, is really a very good species, recognizable at all times by the bright mossy green powdering on the primaries of both sexes. A real fresh example of this form looks very handsome with its bright green against the nearly black base.

Insuda is more gray, especially in the male, but has the same general type of marking as in *undularis*. In the male the terminal area in both wings is paler, and in both sexes the reniform is outwardly marked by white scales. This species occurs in Arizona only and seems to be not uncommon, locally.

Norda and *minerea* are much more contrastingly marked, especially in the male, and they are streaked and mottled with yellowish and dark brown. They have essentially the *lunata* type of maculation, but are somewhat smaller, a little slighter, and a great deal more mottled. In the female, in which there might at times be a question between the species, the abdominal structure affords a ready point of distinction.

Norda is much darker, mahogany brown in the male, less strigillate or mottled, with the terminal areas often brilliantly bluish. The females are usually strigulated and crossed by undulated transverse lines.

Minerea is much more mottled throughout, never so dark nor so brilliantly contrasting, but after all of the same general type, the difference again being more a matter of degree. In the female, too, the colors are not nearly so dark, and the transverse markings are correspondingly more obvious.

Lunifera and *lineosa* are two other allied species, smaller and of slighter build than those just preceding and, on the whole, gray rather than brown in color, without contrasting blue areas at any time. There is quite a bit of variation in the wing form here, and while some examples of *lunifera* have the wings typically *Homoptera*-like, others, especially of *lineosa*, seem to have them much broader, with more arched costa and outer margin, like some Geometrids. The change is gradual however, and there is no other character that seems to distinguish these forms from the rest of the species.

Lunifera is the best marked of the species, the t. p. and s. t. lines being black, and the double extra-median line of the secondaries also black. The tendency on both wings is to a black filling between these lines, so as to form a more or less distinct band, and sometimes a black shading extends prominently into the median area.

Lineosa has none of this contrasting maculation and the lines are only blackish or brown. Sometimes it becomes a matter of nice judgment as to just where to place a given individual, well marked *lineosa* and flown *lunifera* overlapping in either direction. Structurally the species are alike or nearly so, yet I believe them to be distinct.

Unilineata stands by itself in several points. From all the preceding it differs in the greater simplicity of the maculation, lacking the predominating transverse fasciation, and in this it agrees with the immediately following species. The t. a. line, however, is even, without angulation below the costa, and the s. t. and t. p. lines are united into a single line below vein 7. The outer margin also is much more strongly denticulated than in the other species, so that with its rusty grayish brown color we have a form that is recognizable at all times.

The next series of nine species have the wing form somewhat less triangular than in the typical *lunata* type. The primaries have the costa more arched at base, and the apex is rectangular rather than pointed. The transverse fasciation is much less marked, and the extremely oblique character of the markings is modified into a tendency to become almost upright. The t. a. line is single, forms an acute outward tooth on the subcosta, is strongly drawn back on that vein, and then is almost upright in general course to the inner margin. The t. p. line is outwardly bent over the cell, more or less indented or drawn in opposite the reniform so as to make an upright W, and is then incurved again on its course to the inner margin.

The largest of these species is *obliqua*, in which none of the markings are well defined or strongly contrasted, and there is a uniform bluish or violet powdering over the pale brown ground. The reniform is not or only a little darker, and altogether this is a very handsome species without any very positively marked characters.

Metata is a smaller, better marked species, which lacks the hoary appearance and has the reniform black or at least dusky.

In *curema* the t. a. line is black, as it is in the two next following species as well; the color is a darker, very smooth even brown; the median shade is scarcely marked and the reniform is black and contrasting.

Helata is a somewhat rougher, better marked species, the median shade more defined, the t. p. and s. t. lines much better marked, and the s. t. space darker than the rest of the wing.

Squammularis is still better defined, has the median shade as a prominent feature, and the area between it and the basal line gray, so as to form a fairly obvious smooth fascia.

Benesignata has this fascia very much intensified. The entire insect is more powdery, the median shade is really a well developed upright band, and the pale space between it and t. a. line is light gray or even whitish, forming a very conspicuous species.

Largera equals *obliqua* in size and somewhat in appearance, but is powdery throughout, the colors are ash gray and diffuse, and while the median shade is conspicuous, none of the markings are black or contrasting.

Duplicata is a rough, powdery species without strong contrasts of any kind. The lines and shades are all traceable and all well enough marked; but they are all obscured by the dark powdering and must be closely scanned to be made out. In the male there is an area of white scales above the hind angle of primaries that relieves matters somewhat, at the expense of even less definition for the rest of the wing.

Bethunei is smaller than *duplicata* and even more powdery and obscure, without the white shading in the male. But there is an obvious shade of red in the ground color, which is marked in the area over the reniform.

In the section *Zale* there are only a few species, not so closely allied as a whole, and yet not more divergent than those of the *Phœocyma* series.

Two species, *cingulifera* and *woodii*, stand out from the others by their conspicuous transverse strigillation, and yet in other respects they are not at all alike.

Cingulifera has the thorax unusually short, the tuftings uplifted posteriorly, and whitish marked so as to be quite conspicuous, not unlike the same feature in *horrida*. The primaries have the costa unusually arched toward base, making them less than usually triangular. The basal area is conspicuously darker and the reniform is pale, marked with brown lines.

Colorada is more normal as to wing form and thoracic tufting, and has the reniform dusky. The basal area is also dark, but in this species the s. t. line is very distinctly marked, outwardly angulated at the middle, and the terminal area is whitish marked and well defined.

Rubiata is a yellowish brown species with the basal space darker, the t. p. and s. t. lines well defined, and together forming a well-marked outward angulation at the middle. From this there may be a brown shading into the median space, but the terminal area is usually left as the palest part of the wings.

Rubi is the same thing in gray; a little softer and more evenly marked throughout. It is not improbable that the differences as they

appear now from limited material may become evanescent with better collections at hand, but I am quite as ready to expect the contrary.

Yavapai is the same thing in blackish; but this is unquestionably a good species. It is very similar to some forms of *edusina* in maculation, but the sexual characters are quite different. The female also differs from those of the two preceding forms which have the normally lobed seventh abdominal segment by having the segment broken up into irregular plates or pieces around the opening of the *bursa copulatrix*.

Calycanthata and *horrida* agree in having the s. t. and t. p. lines coincident below vein 7 and in appearance the s. t. line only is represented. In both, also, the terminal area is paler; but while that is a normal matter in both sexes of *horrida*, it is exceptional and occurs only in the male of *calycanthata*.

Calycanthata is on the whole almost the smallest species in the genus and is characterized in well-marked examples by white dorsal abdominal tufts.

Horrida has the thoracic tufts elevated, discolorous, and prominent, while the abdominal tuftings are unequal in size and quite conspicuous.

In tabular form the arrangement is as follows:

1. Middle femora of male with a mass of specialized scales ..... subgenus *Phœocyma*, 2
   Middle femora of male without such a mass of specialized scales ..... subgenus *Zale*, 21
2. T. a. line usually geminate, inwardly oblique with a slight outward convexity; even, not angulated or dentate 3
   T. a. line usually single, with an acute outward tooth on subcosta, strongly drawn in on that vein; more or less angulated or bent below 14
3. T. p. line single, slender, outwardly dentate in all the interspaces 4
   T. p. line geminate, irregular, but never outwardly denticulate in the interspaces 6
4. Base and a triangular costal area between t. p. and s. t. lines of primaries darker brown; secondaries with a leaden gray or bluish area beyond the curved extra-median band; more conspicuous in the male ..... *exhausta.*
   Basal and costal areas concolorous or nearly so 5
5. Gray, the lines very fine, not well marked; no contrasts in shading ..... *fictilis.*
   Wood or leather brown, lines well marked, primaries in the males with blue linear shadings beyond s. t. line, in females with intermingled blue and greenish scales ..... *viridans.*
6. Penultimate segment of the female abdomen beneath, complete, though asymmetrical 7
   Penultimate segment of the female abdomen beneath, broken into irregular pieces 8
   Penultimate segment of the female abdomen beneath, divided into two lobes 9
7. Larger, darker, more conspicuously marked; occurs east of the coast range ..... *lunata.*

Smaller, lighter brown, less conspicuously marked; occurs on the Pacific coast ..... *salicis.*

8. Smoky brown, powdery, s. t. line well defined, no dark shading from the outward angulation to the outer margin; reniform marked with white scales; no black line on collar ..... *edusina.*

9. T. p. and s. t. lines form no prominent outward tooth at middle; color uniform, terminal space not paler in either sex, reniform concolorous, with a darker outline 10

T. p. and s. t. lines form a more or less obviously prominent outward tooth above the middle; coloring more or less mottled; in the male the terminal area more or less obviously paler and contrasting 11

T. p. and s. t. lines united below vein 7 into a single yellowish brown line 13

10. Very dark brown, almost black, lines velvety black; a pale or white spot interrupting s. t. line opposite the cell ..... *undularis.*

The median space below costal area is lighter brown, and a lilac gray shading extends over the t. p. and s. t. lines from the inner margin above the middle of the wing ..... *umbripennis.*

Blackish brown with mossy green powderings, forming a more or less obvious band beyond the t. a. line ..... *æruginosa.*

11. In the female very evenly dark brown with darker transverse lines, a broad continuous blackish band beyond the s. t. line; in the male the terminal area gray, not blue; in both sexes the reniform white marked ..... *insuda.*

Mottled in both sexes; no obvious dark band beyond s. t. line; male with terminal area tending to blue; reniform dark, not outlined 12

12. Dark red or mahogany brown, not mottled nor contrasting except in the terminal area in males, which is often brilliantly bluish or violet ..... *norda.*

Mottled yellow to blackish brown, usually contrastingly marked especially in the male, the terminal area in the latter often sordid and rarely clear in tint ..... *minerea.*

Pale leather brown; s. t. and t. p. lines distinct, black, intervening space often black or blackish; a dusky shade often extends from angulation of s. t. line to the outer margin ..... *lunifera.*

Gray or grayish brown, none of the lines contrasting, and no dusky shade from angulation of s. t. line to outer margin ..... *lineosa.*

13. Color rusty grayish brown, powdery, outer margin very strongly dentate ..... *antilineata.*

14. Vestiture of wings smooth, not rough, powdery, nor velvety 15

Vestiture of wings roughened, powdered so as to obscure the maculation or give a velvety appearance 18

15. Basal and t. a. lines wanting or at least not well defined nor black 16

Basal and t. a. lines well defined, black 17

16. Larger; a uniform bluish or violet powdering over pale brown; hoary; no well-defined contrasts; reniform not or only a little darker ..... *obliqua.*

Smaller, better marked, not hoary in appearance nor powdery; reniform dusky, sometimes black ..... *meteta.*

17. Very smooth and even, median shade very little marked; reniform contrasting, black ..... *suprema.*

Somewhat more mottled; s. t. and t. p. lines better marked, the s. t. space darker; median shade well defined ..... *beleta.*

Less mottled, all the lines and spaces well defined; a gray shading between t. a. and median shade ..... *brunneomarginata.*

18. All the maculation bright, median shade band distinct; space between it and t. a. line contrastingly gray ..... *benesignata.*
Space between t. a. and median shade not gray, contrasting 19
19. Median shade conspicuous, diffuse; color ash gray; none of the lines black or contrasting ..... *largera.*
Median shade obscure or not well defined, colors dull or smoky, lines usually distinct and black 20
20. Larger, darker, better marked, no conspicuous reddish shade; in the male the terminal space is powdered with white and there is a whitish blotch at anal angle ..... *duplicata.*
Smaller, more obscure; an obvious reddish shade through the basal color; no white in terminal area of male primaries ..... *bethunei.*
21. Primaries with numerous black, transverse strigillations 22
Primaries not obviously strigillate 23
22. Patagia divergent, whitish discolorous; reniform whitish with brown lines ..... *cingulifera.*
Patagia normal, not discolorous; reniform dusky, not outlined ..... *colorado.*
23. T. p. and s. t. lines distinct, forming an obvious outward angle at middle 24
T. p. and s. t. lines coincident below vein 7 25
24. Some shade of wood or leather brown ..... *rubiata.*
Some shade of ash gray ..... *rubi.*
Almost black, with black markings ..... *yavapai.*
25. Red or leather brown; thoracic tuftings normal; terminal area tending to become pale or discolored in the male only ..... *calycanthata.*
Deep chocolate brown; thoracic tufts discolored, uplifted, conspicuous; terminal area of primaries discolorous pale in both sexes ..... *horrida.*

PHÆOCYMA EXHAUSTA (Guenée).

1852. *Homoptera exhausta* GUENÉE, Spec. Gen., Noct., III, p. 14.
1857. *Homoptera exhausta* WALKER, C. B. Mus., Het., XIII, p. 1053.

Ranges in ground from creamy or blue gray to yellow brown. In the brown specimens the head, thorax, and abdomen are concolorous; in the pale specimens the head is usually gray, the collar and anterior portion of thorax brown; rest of thorax and abdomen gray. Collar always with a black transverse line. Primaries with basal area, a triangular costal area between t. p. and s. t. lines and often a diffuse area at middle of costa darker brown and in the gray specimens contrasting. T. a. line marked chiefly by the difference in tint between basal and median space, very oblique, only a little outcurved. Ordinary spots vaguely indicated or altogether wanting. Orbicular small, brown, punctiform; reniform upright, narrow, a little constricted, concolorous and only definable when there is a brown shading at middle of costal area. T. p. line black, slender, outwardly denticulate in all the interspaces below the cell. S. t. line brown, tending to become broken and partially lost, inwardly convex to the middle where it extends in a brown shade to the outer margin and thence again, not so much incurved toward the inner margin. Secondaries with a double extra-median line, of which the outer is the more con-

spicuous. Basally there are obscure alternate lighter and darker shade lines; exteriorly there is a bluish band which in the male tends to form an oval spot or mark. Beneath yellowish brown crossed by brown strigillations which tend to become massed into a darker submarginal shading.

Expands, 1.60–1.80 inches=40–45 mm.

Habitat.—Florida: Chokaloskee in July.

Four males and two females are before me, all save one male from Doctor Ottolengui's collection. There are others from various Central and South American points in the Schaus collection, U. S. National Museum, and there is no doubt that this is distinctly a subtropical and tropical form. It is probable that all the specimens come from one source originally, and that it is from one of those localities that receives southern visitors or has really a subtropical element in its fauna. Guenée describes it from Brazil, with the addition of a doubtful specimen from "Am. Sept." Walker records the British Museum example from Santo Domingo.

The females are darker than the males, less conspicuously marked and obviously strigillate. The males tend to the creamy gray type and to a form which has the blue area in secondaries almost ocellate in type.

The spinulation of the middle tibia is well marked. The sexual tufting in the male is very conspicuous and the mass of specialized scales relatively enormous.

The sexual structures are very characteristic in both sexes. In the male the harpes are not strikingly dissimilar; but the supra-anal plate is prolonged posteriorly into a flat plate, from the lower side of which comes the slender, corneous uncus. In the female there are two small, slightly asymmetrical plates on the posterior margin of the terminal segment, and at the upper angle of the junction of these two plates is the opening to the copulatory pouch.

PHERETIMA FICTILIS (Grote).

1852. *Homoptera fictilis* Grote, Spec. Gen., Noct., III, p. 10.
1852. *Homoptera quadrilineata* Grote, Spec. Gen., Noct., III, p. 10.
1857. *Homoptera fictilis* Walker, C. B. Mus., Het., XIII, p. 1068.
1857. *Homoptera quadrilineata* Walker, C. B. Mus., Het., XIII, p. 1068.

A rather light gray brown in the male, deeper and more reddish in tinge in the female. Collar with a black median line. Thoracic tufts flattened and explanate in somewhat wing-like in character. Basal abdominal tufts also flattened and very broad; other dorsal tuftings small. Primaries very even in color, without darker areas or strong contrasts. Basal line indicated by geminate costal spots in some specimens. T. a. line geminate, obscure, very oblique. Orbicular small, punctiform, often lost. Reniform more or less com-

pletely outlined in yellowish scales. T. p. line very slender, black, single, outwardly denticulate in the interspaces, a little emphasized and thickened just below vein 2. S. t. line hardly traceable as such; a leaden gray or brown band from inner margin near anal angle with a slight incurve to middle of outer margin. A series of blackish interspaceal terminal marks. Secondaries with disc crossed by obscure lighter and darker shade lines. A pair of narrow black extra median lines of which the inner is even or nearly so and the outer forms outward dents in the interspaces between 5 and 6 and 6 and 7. In the male there is a blackish spot at anal angle from which a bluish shading extends toward the apical angle; in the female a leaden gray or brown band extends from apex to anal angle below the black lines. A series of interspaceal dark or black spots. Beneath yellowish, crossed by numerous brown strigillations.

Expands, 1.80–2.12 inches=45–53 mm.

Habitat.—Brownsville, Texas, in June; Marco, Florida, in July; Egmont, Florida, April 29.

A series of 10 males and 2 females from the above localities; others are in the Schaus collection, U. S. National Museum, from various South and Central American points. The species is very characteristic and Guenée's descriptions apply perfectly. The specimens in the Schaus collection were directly compared with the types by Mr. Schaus, and the determinations correspond with those made by me from the descriptions. There is enough difference between the sexes to justify a separation into species, with limited material. The males are very uniform and very characteristic in color and in the extramedian line of the secondaries. The females are much darker, more like *lunata* in color, much more strigillate and with the peculiarities of extra-median line of secondaries less marked. The only strong point that the two sexes have in common is the yellowish scale edging to the reniform. The denticulate t. p. line, of course, serves to distinguish it from any form of *lunata* which it might otherwise resemble.

The femoral tufting of the male is large and the mass of specialized scales is huge, larger in proportion and actually, than in any other of our species.

The genital structure of the male is almost symmetrical, the lateral pieces moderate in size and simple in form. The uncus, however, is unusually long, stout, and heavy, transversely somewhat flattened and with a membraneous secondary structure within and parallel to it.

The female has the anal plate entire and the opening to the copulatory pouch is from the median line at the inferior margin; symmetrical in all respects.

PHÆOCYMA VIRIDANS (Guenée).

1852. *Homoptera viridans* GUENÉE, Spec. Gen., Noct., III, p. 13.

Yellow brown, ranging to smoky in the female. Primaries, in the male, the basal area a little darker, outwardly limited by the very oblique, geminate, brown t. a. line. There is a narrow shade band of blue in which the brown, punctiform orbicular is visible; there are two incomplete transverse dusky lines and the reniform is obscurely indicated by a few pale scales and a slightly darker shading. T. p. line slender, black, single, outwardly denticulate in the interspaces. S. t. line broken, obscure, brown, on the whole almost parallel with the outer margin, emphasized on the costa by an apical smoky shade and below the middle by a blackish brown fascia from the middle of outer margin, curved to the inner margin just within anal angle. There is a yellowish, broken terminal line, preceded by dark interspaceal blackish marks which are most conspicuous just above the anal angle. Secondaries with obscure discal lines to the double extra-median black lines which tend to form a band, outwardly margined by yellow and followed by a shading of blue. In the female the primaries are so crossed by brown strigillations, more or less mixed with mossy green scales and shades, that no other maculation is recognizable except the characteristic t. p. line, which is brown rather than black and not conspicuous. The marking of the outer portion of the wing is barely indicated. On the secondaries the transverse striations are equally abundant, but the double outer black line is distinct, and there is more or less green or blue in the dusky shading beyond it. Beneath, both sexes are yellowish with numerous transverse brown striations.

Expands, 2–2.20 inches = 50–55 mm.

Habitat.—Miami and Marco, Florida.

I have only two males and three females, none of them perfect and all of them with thoracic vestiture defective. I have cited only the original description of the species because I am not at all sure that the species has been correctly referred to later and still less certain that some other names should not be referred here. The species that I have agrees fairly well with Guenée's characterization and is the same as that in the Schaus collection, U. S. National Museum, marked as compared with the type in Paris.

The species differs from all others of those in our fauna by having on the underside of the male secondaries a large area of fine long hair which covers a large part of the disc, and on the cell of the primaries a less conspicuous clothing of similar hair. The tuftings of the middle femora of male are also large and similar to that in *fictilis*.

The male genitalia are symmetrical or nearly so. The harpes are moderate in size, but stout and with obliquely spatulate tips; the

uncus is similar to that in fictilis and equally stout, though somewhat different in form.

The female genitalia are also symmetrical. The ventral plate of the terminal segment is complete and the opening to the copulatory pouch is from the median line at its inferior margin.

PHÆOCYMA LUNATA (Drury).

1770. *Noctua lunata* DRURY, Illustr., I, p. 40, pl. xx, fig. 3.
1773. *Noctua edusa* DRURY, Illustr., II, pl. xxiv, fig. 4.
1829. *Homoptera putrescens* GUERIN, Icon. Règne Anim., pl. lxxxix.
1830. *Erebus lunata* WESTWOOD, ed. Drury, I, p. 37, pl. xx, fig. 3.
1830. *Erebus edusa* WESTWOOD, ed. Drury, II, p. 46, pl. xxiv, fig. 4.
1852. *Homoptera lunata* GUENÉE, Spec. Gen., Noct., III, p. 12.
1852. *Homoptera edusa* GUENÉE, Spec. Gen., Noct., III, p. 14.
1852. *Homoptera putrescens* (=*edusa*) GUENÉE, Spec. Gen., Noct., III, p. 14, larva.
1857. *Homoptera lunata* WALKER, C. B. Mus., Het., XIII, p. 1053.
1857. *Homoptera edusa* WALKER, C. B. Mus., Het., XIII, p. 1054.
1857. *Homoptera involuta* WALKER, C. B. Mus., Het., XIII, p. 1055.
1864. *Homoptera saundersii* BETHUNE, Proc. Ent. Soc. Phil., IV, p. 215.
1865. *Homoptera lunata* BETHUNE, Can. Journal, X, p. 252.
1865. *Homoptera edusa* BETHUNE, Canadian Journal, X, p. 9.
1865. *Homoptera involuta* BETHUNE, Can. Journal, X, p. 253.
1865. *Homoptera saundersii* BETHUNE, Can. Journal, X, p. 257.
1877. *Homoptera lunata* (=*edusa*) BEAN, Can. Ent., IX, pp. 174, 228.
1877. *Homoptera edusa* BEAN, Can. Ent., IX, pp. 174, 228.
1877. *Homoptera saundersii* (=*lunata*) BEAN, Can. Ent., IX, p. 174.
1878. *Homoptera edusa* (=*lunata*) LINTNER, Ent. Cont., IV, p. 108.
1878. *Homoptera saundersii* (?=*lunata*) LINTNER, Ent. Cont., IV, p. 109.
1882. *Homoptera lunata* FRENCH, Can. Ent., XIV, p. 131, life history.
1893. *Homoptera involuta* (=*edusa*) SMITH, Bull. 44, U. S. Nat. Mus., p. 369.
1901. *Homoptera edusa* BEUTENMÜLLER, Journ. N. Y. Ent. Soc., IX, p. 192, larva on willow.
1903. *Homoptera lunata* HOLLAND, Moth Book, p. 278, pl. xxxvii, fig. 17.
1903. *Homoptera edusa* HOLLAND, Moth Book, p. 278, pl. xxxvii, fig. 16.

Ground color luteous to chocolate brown. Head concolorous. Collar with a black median line, and usually in the female a broad dusky band below tip. Thorax crossed by broad dusky bands; one of them, behind the middle, posteriorly edged with gray, so that in some cases it forms quite a conspicuous whitish fascia. Abdomen with the segments tending to become finely black ringed; the dorsal tufts very small and often wanting. Primaries varying greatly in tint and in distinctness of maculation. Basal space usually a little darker and crossed by brown shade lines. Basal line geminate, rarely distinct, usually indicated. T. a. line geminate, sometimes fasciate, very markedly oblique, reaching the inner margin within basal fourth while starting at basal third of costa. T. p. line geminate, usually only the inner line distinct, black or brown, outwardly oblique to vein 4, roundedly exserted in the interspaces, sometimes

forming obtuse teeth; very oblique below vein 4, more or less irregular but never forming long or sharp outward dents. The median space may or may not be crossed by 2 or 3 very oblique shade lines at or before the middle, and there may or may not be a darker brown shade over the costal region. In the male there is more or less blue powdering just beyond the t. a. line. Orbicular a small brown dot which may or may not be obvious. Reniform oblique, lunate, dusky, not outlined, outwardly marked by a few white scales. S. t. line very incomplete, usually distinct only below vein 4, whence it makes a slight incurve, is accompanied by a pale outer line and followed, in the female, by a conspicuous blackish brown band; in the male this band may be traversed by a line of lilac blue scales and sometimes the entire lower portion of the terminal area is blue filled. Above vein 4 the s. t. line is very obscurely traceable to vein 7, above which the s. t. space is dark filled and forms an edging to the line. When this dark filling is not well marked the line itself becomes obscure or lost. There is usually a dusky apical spot and, in the male, there may be an edging of blue scales outside of the line, or the terminal area may be washed with blue, forming in the best marked cases two blue lunate marks, separated in the middle of the wing by a brown shade which extends to the outer margin. There is a more or less obvious brown terminal line, and the pale fringes have a dusky interline. Secondaries a little paler at base, followed by a series of alternate pale and dusky discal shade lines. A very slender blackish line continues the s. t. line across the secondaries, and beyond that a better marked line, which is more or less outcurved in the interspaces, extends with a slight incurve approximately from apex to anal angle. Beyond this, in the female, there is a blackish-brown shade band which, in the male, becomes blue edged, or the entire terminal area may be washed with blue. Beneath more yellowish, strigillate, and powdered, with a large dark discal lunule, a lunulate extra-median line, and an obscure, diffuse outer shade on all wings.

Expands 1.75–2.30 inches=43–58 mm.

Habitat.—Throughout the United States, from Canada to Florida, west to the Rocky Mountains, into Texas and Arizona, at dates ranging from March to December.

This is perhaps the most common of our species and the most widely distributed. It is also the largest and the principal late autumn species. None of the specimens in my hands are spring examples except a few from Texas, which may be hibernates, and by far the greater number are in September and later. *Minerea* is typically a spring species and few examples hold on into July. Where these two occur together, *minerea* has usually disappeared before *lunata* makes its appearance. The two may resemble each other very closely, especially in the female, and I have found them mixed in

collections. *Minerea* is usually much more strigillate, however, and has a rather well-defined small lunate reniform, while *lunata* has the reniform much longer, narrower, and usually indefined superiorly. There is not, of course, any really close relation between the two; but they do occasionally resemble each other so much as to cause trouble.

The range of variation has been largely indicated in the description. In general there are two types, those with the median space distinctly paler and those with the wings as a whole concolorous. This range occurs in both sexes, and it is quite easy to arrange two very well marked series with limited material. In the males there are also two forms, those that have the terminal area washed with blue, forming 2 lunate areas on primaries and one on secondaries, and those in which there is only an edging of scales or a blue line beyond the s. t. line. Aside from that almost any one feature may vary in prominence, so that with fifty examples at hand it may be difficult to find two of them exactly alike.

The spinulation of the median tibiæ is obvious in both sexes, and in a fair proportion of cases there are spines between the two pairs of spurs of the posterior tibiæ. This feature has been already discussed sufficiently to bring out the range of variation. In the male the sexual tufting of the median femora is distinct and the mass of specialized scales is large and conspicuous.

The male genitalia are grotesquely asymmetrical. The left harpe is single, broad at base but rapidly narrowed to a slender flattened strip, which becomes roughened, a little enlarged, and irregular at tip. The right harpe is double; that is, the base is broad and single, but it divides almost at once into a slender upper and lower process, of which the upper is first bowed up, then bent down and furnished with a little prong not far from tip. The lower process follows the reverse course and bends upward, is also forked toward tip, but the forks are much longer and they almost engage the fork of the upper process. There is considerable variation in the specimens in this forking; but in essentials the structure is identical in all the examples observed. The corneous penis sheath is very sharply bent and really crook-like in outline seen from the side.

The female is in its way as characteristic as the male and has the terminal segment complete, not divided into lobes. At the extreme right of the segment is a corneous ring which forms the opening to the copulatory pouch, and this is furnished with a single, jointed, cercus-like appendage. A reference to the figures will be necessary to really understand the structure.

The synonymy given at the head of this species is probably not complete, but it is as complete as I feel certain about it. Under the name *lunata* there are at least two and probably three species from

South and Central America, as indicated by the specimens so labeled in the Schaus collection. Cramer's figure (Plate CCCVIII, fig. *c*), heretofore cited to *lunata*, certainly does not represent that species at all. Whether *putrescens* Guerin really belongs here I consider distinctly questionable. Guenée seems to consider them the same on larval characters, and I am simply following his citation without further personal knowledge.

Walker refers to *viridans* Guenée, and indicates its possible identity with *lunata* Cramer. *Viridans* Walker, however, seems to be really a form of *lunata* Drury, and not the species in mind by Guenée.

Edusa Drury is merely the male of *lunata*, the sexual differences being regarded as of specific rank. It is the form in which the terminal area is filled with blue powderings, making two lunate areas on primaries and one on secondaries.

The form named *saundersii* by Doctor Bethune is that in which the median area becomes paler, more yellowish, and sometimes contrasting. Inasmuch as this form occurs in both sexes, limited material would easily seem to justify the separation. In the collection of the American Entomological Society in Philadelphia there is a specimen labeled by Mr. Grote as having been compared with type, and that bears out the characters given in the description. The actual type is no longer in existence.

The *involuta* of Walker represents that form of *lunata* in which the exterior lines are unusually well marked, and the darker areas are along the costal region, really very much like *saundersii*. I marked it in my notes in 1892 as being the *edusa* form with the blue out. The possibility of error on my part is not excluded, however, for the description applies more nearly to some forms of *minerva* which I was not in position to discriminate in all cases in 1892. At all events the name can not be restored for any existing species even if the present reference is erroneous.

How many, if any, of the names applied to West Indian and South American forms must be cited here I am in no position to determine at present.

PHÆOCYMA SALICIS (Behr).

1870. *Homoptera salicis* BEHR, Trans. Am. Ent. Soc., III, p. 28.
1870. *Homoptera rosæ* BEHR, Trans. Am. Ent. Soc., III, p. 28.

In the essential characters of maculation this is like *lunata*, differing from that species in the somewhat smaller size and the less contrasting colors and markings. Line for line the ornamentation is the same in the two species, but the California specimens have a smoother appearance throughout, the lines are not so well marked and what contrasts there are in the color and maculation are very much less conspicuous.

Expands, 1.60–2.00 inches=40–50 mm.

Habitat.—California: Sonoma County, Los Angeles County, in November; San Louis Obispo in February; San Francisco, Behr.

I have a specimen of *salicis* given me by Doctor Behr himself, and I have seen the type of his *rosæ*. My impression is that he described the sexes of the one species, but that is not certain; at all events there are no two closely related forms on the Pacific coast so far as the material in my hands indicates. It is not even absolutely certain that we have a species distinct from the eastern *lunata*, although that I believe. Superficially, if the Californian examples were mixed with a lot of eastern material they might attract attention as being less well defined than the ordinary run of examples, but would not be suspected of representing a distinct species. Structurally, the differences are hardly greater. In the male the lateral pieces are identical in type and the differences in detail are not greater than I might consider within specific range. The uncus, however, is quite markedly different and is drawn out to a slender point unlike any *lunata* that I have seen. In the female the differences are somewhat greater and can be best appreciated by a comparison of the figures.

It may be that when both eastern and western forms have been fully compared in all their stages, the question of their specific identity can be more easily determined.

PHÆOCYMA EDUSINA (Harvey).

1875. *Homoptera edusina* HARVEY, Bull. Buff. Soc. Nat. Sci., III, p. 14.
1875. *Homoptera atritincta* HARVEY, Bull. Buff. Soc. Nat. Sci., III, p. 14.
1878. *Homoptera atritincta* (=female of *edusina*) GROTE, Bull. U. S. Geol. Surv., IV, p. 185.
1893. *Homoptera atritincta* (= *edusina*) SMITH, Bull. 44, U. S. Nat. Mus., p. 370.

Ground color dull smoky brown. Head concolorous, sometimes with a dark median line. Collar darker at base and below tip, leaving a paler brown central line, often gray tipped; no distinct black line in any specimens. Thorax with alternate darker and paler lines more or less distinct, sometimes gray. Abdominal tufting small. Primaries with all the lines usually well defined. Basal space usually a little darker. Basal line brown or blackish, geminate, usually well defined. T. a. line geminate, the component lines quite widely separated, the inner less obvious, outer black or blackish, irregular, a little outcurved but on the whole inwardly oblique. Just beyond this line is usually a little the palest area in the wing, in the males usually and in the females often powdered with gray. Beyond this the median space is crossed by three more or less obvious undulated transverse lines, of which two are nearly upright, while the outer is curved around the outside of the reniform. T. p. line narrow, thread-like, black or brown, irregular, broadly and rather squarely exserted over cell, just a little indented opposite reniform, oblique rather than in-

curved from cell to inner margin. Orbicular a black or brown dot, sometimes very distinct, sometimes not traceable. Reniform lunate or kidney shaped, often defined inwardly by black scales, outwardly more or less marked by white scales. S. t. line black, and usually the most distinct feature in the wing, making an incurve from each margin to an acute outward tooth at middle. The line may be a little diffuse inwardly, and the entire s. t. space may be a little darker. Terminal area usually a little lighter than the rest of the wing and sometimes conspicuously gray powdered; most obviously and usually in the male. There is a brown terminal line following the indentations of the margin, a little thickened at the indentations, where it is outwardly emphasized by white lunules. Secondaries paler than the primaries toward base, and disk crossed by three darker, undulated lines. Outwardly there is a distinct black line continuing the s. t. line of primaries, and within that there is a less defined, usually brown line continuing the t. p. line. Both these lines are a little rivulous and the space between them is often darker. Outwardly the outer line is edged with pale scales or a pale line, and the terminal area is usually continuous with and similar in character to the terminal area of the primaries, with a similar outer line. Beneath smoky, sometimes varying to reddish or yellowish, more or less powdery, with more or less obvious discal spots and variably obvious dusky lines, of which there are usually one on primaries and two on secondaries; sometimes none on either.

Expands, 1.20–1.60 inches = 30–40 mm.

Habitat.—Texas, February to August.

In the series before me, Bastrop County, Bennett County, Brazos County, Shovel Mountain, San Antonio, and Kerrville are specifically represented and in the dates every month between the limits given is also represented. In addition I have an example labeled "N. Y." and another labeled "Ky.," which I consider doubtful but worth mentioning.

The species seems to be common and distinctly variable. As between the sexes the males are usually smaller, more contrastingly marked, and have a considerable admixture of gray scales in the terminal area. In the females the color is on the whole darker and more uniform. Typical *edusina* are all males; typical *atritincta* are all females; yet there are light and dark forms of both sexes. A little series of specimens from San Antonio in the Barnes collection are almost as dark as *yavapai* in both sexes and might, at first blush, be easily confused with that species. The easiest superficial character to separate them is in the clearly defined black line on the collar of *yavapai;* in *edusina* there may be some black scales at base of collar, but there is a pale shade above it and it is not a median line. Specimens of both forms, labeled by Mr. Grote, are in the U. S. National Museum collection, and these are also specimens from Belfrage.

agreeing in collection number with those described by Doctor Harvey, so that there can be no question as to the Harvey species.

The spinulation of the middle tibiæ in both sexes is scant; but the spinules are long and are as a rule readily made out through the vestiture. The femoral tufting in the male is distinct and the mass of specialized scales is large and conspicuous.

The genital structure of the male is grotesquely asymmetrical. The left side has, beside the broader lateral piece, an accessory structure which is long, slender, and extends beyond the tip of the broader portion. The uncus is unusually long and is transversely compressed or flattened into a blade, utterly unlike the usual forms.

In the female the upper surface of the segment is not modified, but on the under surface it is curiously broken up into small chitinous plates, surrounding the large opening to the copulatory pouch, which is on the lower part of the segment. There is no appearance of a division into distinct lobes or plates.

PHÆOCYMA UNDULARIS (Drury).

1770. *Noctua undularis* DRURY, Illustr., I, pl. IX, fig. 4.
1816. *Anthracia undularis* HÜBNER, Verzeichniss, p. 275.
1852. *Ypsia undularis* GUENÉE, Spec. Gen., Noct., III, p. 18.
1857. *Ypsia undularis* WALKER, C. B. Mus., Het., XIII, p. 1074.
1864. *Homoptera nigricans* BETHUNE, Proc. Ent. Soc. Phil., IV, p. 214.
1865. *Homoptera nigricans* BETHUNE, Canadian Journal, X, p. 252.
1877. *Homoptera umbripennis* GROTE, Can. Ent., VIII, p. 109.
1893. *Homoptera umbripennis* (var. of *undularis*) SMITH, Bull. No. 44, U. S. Nat. Mus., p. 373.

Ground color ranging from very dark smoky brown to sooty black, often somewhat shining. Head and thorax without obvious markings; dorsal tuftings of abdomen small. Primaries very uniform in color. Basal line geminate, dead black or velvety black so as to be visible on the dark ground. T. a. line geminate, the outer portion of line usually velvety black, the inner less obvious; as a whole rather evenly oblique from costa to inner margin. The median area is crossed by three broad, somewhat diffuse dead black lines. Orbicular sometimes marked as an intense black spot. Reniform narrow, oblique, laterally defined by intense black scales. T. p. line black, sometimes geminate, the lines very slender, outcurved over the cell, a little drawn in opposite reniform and then almost evenly oblique to inner margin, not much beyond its middle. S. t. line better marked, broader, more intensely black, interrupted by a white or pale spot opposite cell, moderately outcurved just below this spot, else very even in course. A darker terminal line, sometimes emphasized by venular white dots. Secondaries basally a little more brown in most specimens, the disk crossed by three, somewhat diffuse, slightly undulating lines. A conspicuous intensely black line continues the s. t. line of primaries across the secondaries to the anal angle. Beneath,

somewhat rusty smoky brown, with darker discal spots and a variable number of transverse shade lines.

Expands, 1.52–1.88 inches=38–47 mm.

Habitat.—Canada to Florida, west to Colorado.

In the large series of specimens before me, only the range from Canada to the District of Columbia is represented; dates ranging from May to early July.

There is no appreciable difference between the sexes and very little variation of any kind in the typical form. The very dark blackish brown base varies a little so that the dead black undulating shade lines may be more or less obvious, and in the same way the velvety black transverse lines are variably relieved. The most conspicuous feature of the primaries is the white blotch interrupting the s. t. line between veins 5 and 6; it may be reduced to only a few white scales, or it may be a conspicuous spot; but it is always present and is absolutely characteristic.

The variety *umbripennis* has the area below the cell from t. a. to s. t. lines of a rich brown shade, and along the course of the t. p. a powdering or even a broad shade of lilac gray scales that is very conspicuous. The white spot in the s. t. line is wanting in all examples. The secondaries have the basal area brown like the median area of primaries, and the lilac shading over the outer lines is continuous with that of the primaries. There is never any question as to which is *undularis* and which is *umbripennis*, and I was strongly inclined, at first, to consider them specifically distinct. But there is absolutely no material difference in genital structure so far as I can make out, and this type of variation is quite usual in the genus, although not equally well marked in any other species.

The spinulation of the middle tibia is scant and inconspicuous; in the male almost invisible in the heavy vestiture. The middle femora of the male are conspicuously tufted and hold a very large mass of specialized scales.

The male genitalia are very nearly symmetrical so far as the harpes are concerned, both sides being long, very much curved, drawn to a point, but with a little, spatulate enlargement before the tip. The supra-anal plate is unusually narrow, and the penis sheath unusually bent and angled.

In the female the depressions of the upper side of anal segment are well defined; on the under side the lobes are well marked and approximately equal. The opening to the copulatory pouch is at the inner upper angle of the right lobe and comes from the inner side rather than from the top.

The species is usually a common one where it occurs. It should be added that the reference of *Homoptera nigricans* Bethune to the synonymy is made on the basis of Doctor Bethune's own statements

in letters to Doctor Dyar and myself, and the description, which is very good indeed, would leave no doubt in any case. The type is no longer in existence.

PHÆOCYMA ÆRUGINOSA (Guenée).

1852. *Ypsia æruginosa* GUENÉE, Spec. Gen., Noct., III, p. 17, pl. XVIII, fig. 7.
1857. *Ypsia æruginosa* WALKER, C. B. Mus., Het., XIII, p. 1074.
1857. *Homoptera plenipennis* WALKER, C. B. Mus., Het., XIII, p. 1055.
1865. *Ypsia æruginosa* BETHUNE, Canadian Journal, X, p. 259.
1878. *Ypsia æruginosa* GROTE, Bull. U. S. Geol. Surv., IV, p. 185.
1883. *Ypsia æruginosa* (= *undularis*) GROTE, Papilio, III, p. 73.
1893. *Ypsia æruginosa* var. *undularis* SMITH, Bull 44, U. S. Nat. Mus., p. 373.
1893. *Homoptera plenipennis* (=*æruginosa*) SMITH, Bull. 44, U. S. Nat. Mus., p. 373.

Ground color very deep brown to almost black. Collar with a velvety black median line, tipped with blue green scales. Thorax with three more or less obvious transverse lines that may be either obscured or emphasized by green scales. Dorsal tufts of abdomen tipped with green. Primaries more or less powdered with green scales having usually the tint of verdigris, but sometimes more blue. These scales, while they may be distributed throughout the wing, are usually massed so as to form a diffuse shade beyond the t. a. line, a conspicuous shading in and over the reniform, and venular marks in the terminal space. The t. a. line is black, even, single, inwardly oblique, with a slight and even outcurve in its course. Orbicular a black dot, usually visible in the green shade band. Median shade lines usually obscure. Reniform large, broad, defined only at the sides by black scales or lunate marks. T. p. line slender, black, single, outwardly bent over the cell, deeply but obtusely indented opposite the reniform, rather evenly oblique below vein 4. S. t. line black, inwardly diffuse, tending to become broken on the veins, more or less completely interrupted from veins 5 to 7; in course it forms a little inward angle on vein 4 and is then a little inwardly arquate on its way to the margins. There is a series of green terminal dots on the veins. Secondaries usually a little more brown to the black line which is continuous with the s. t. of primaries, the disc crossed by three more or less obvious undulating darker lines and powdered with green; most obviously so at extreme base. Beyond this outer black line, which tends to be inwardly diffuse, there is an edging of green scales, and there is more or less green in the terminal area, tending a little to mass at the anal angle. A series of green venular points at base of fringes. Beneath rusty brown, powdery, a series of conspicuous whitish terminal dots on veins, and these white dots preceded by black points. Both wings with a dusky lunule and crossed

by a variable number of undulating transverse lines or shades; usually more numerous on the secondaries.

Expands, 1.48–1.80 inches = 37–45 mm.

Habitat.—Canada to Southern Florida, west to the Mississippi and probably to the Rocky Mountains.

In the series before me all the specimens from the northern range are in May. In a little series from Tryon, North Carolina, from the Fiske collection (U. S. National Museum), dates are April 30, May 6, July 7, and August 9.

The range of variation is chiefly in the amount of green powdering; but there is also some difference in the ground, and occasionally there will be an example that bears almost the same relation to the type form that *umbripennis* does to *undularis;* but the distinction does not become so marked at any time and there is never any hesitation as to where such a specimen belongs.

The species has been referred as a variety of *undularis;* but it is distinct throughout from that species, when close comparison is made. The green powdering which is present in every example of *æruginosa* and never present in any *undularis* is sufficient for all ordinary purposes. In addition, the shape of the reniform is altogether different, the course of the s. t. line is characteristic in each species, and, finally, the genitalic structure is decidedly unlike in both sexes. The spinulation of the middle tibia is scant in both sexes and not easily found. The sexual tufting on the middle femora of the male is conspicuous and the mass of specialized scales is large.

The male genitalia are markedly asymmetrical, the left harpe formed into a much longer, narrow, curved process than the right, which, broad for the greater portion of its course, is abruptly narrowed to a slender bent process.

The female genitalic structure is equally characteristic. Above, the depressions on the last segment are rather conspicuously marked with rusty yellow scales; beneath, the lobes are markedly dissimilar in size, the right much the smaller, almost oval, and having the opening to the copulatory pouch at almost the middle of the upper margin.

The species seems to be less abundant than its near ally.

PHLOCYMA INSUDA, new species.

Ground color dull leather brown, with smoky shadings, the female much darker than the male. Front of the head white or yellowish, limited above by a transverse black bar, which in turn is surmounted by a white line limiting the concolorous vertex. Collar with a dusky transverse line more or less obviously shaded by a paler tint on one or both sides. Thorax crossed by two darker lines, more or less obviously margined posteriorly by paler scales. Basal space to the t. a. line crossed by narrow brown and grayish lines, which are more obvi-

ous and brighter in the male. T. a. line black, a little curved, irregular on the cell, as a whole inwardly oblique. In the male this line is followed by a belt of bluish scales which are quite conspicuous; in the female there is a similar band, but the scales are more scattering, of a duller tint, and over a much darker ground, so that they are not relieved. A punctiform black orbicular may or may not be included in this band. Two undulating dusky lines cross before the middle and aid in darkening that area; a third and sometimes a fourth are more obscure and cross beyond the middle, which is the palest portion of the wing. The reniform is narrow, upright, a little darker, anteriorly marked by black and posteriorly by white scales; both of these distinctions more obvious in the female. T. p. line black, slender, continuous, outwardly edged by yellow scales in some females, irregular, in general outwardly oblique from costa to near middle, then with a rounded angle bent inwardly and oblique to the inner margin. S. t. line broader, more diffuse, tending to become broken on the veins by bluish dots, parallel to but well removed from t. p. line to vein 7, where it diverges and runs outwardly oblique to the costa. The space between these lines is darker than the median space, and the s. t. line is followed by a broad band which in the male is as dark and in the female much darker than the included shade. Beyond this band is a paler brown shade which in the male is blue powdered, and in the female is strigillate with darker brown. Outwardly there is a darker brown marginal shade, broken by pale lunules at the incisions. The fringes have a yellowish line at base and are strigillate with brown. Secondaries pale brown to the middle, then with two or three more or less obvious, somewhat diffuse transverse lines before the double, black, extra-median line, the inner portion of which is narrow, thread-like, even; the outer edged with yellow scales, and forming a small $\lesssim$ near the upper part of its course. Beyond this is a much darker band in the female, and in the male a blue powdering. The terminal area and fringes are as in the primaries. Beneath brown, powdery, all wings with a discal spot and an extra-median brown line, secondaries sometimes with two lines within and one or two beyond this line. A series of whitish dots at the incisions on both wings.

Expands, 1.25–1.92 inches=31–48 mm.

Habitat.—Southern Arizona: Yavapai County, August 11–25 (Hutson); Santa Rita Mountains, 5–8,000 feet, July (Snow); Chiricahua Mountains (Barnes); Prescott, July, August (Buchholz).

Type.—Rutgers College Collection: cotypes U.S.N.M., Type No. 12023; also collection O. Buchholz.

The color contrast between the sexes is very strongly marked in this species and yet there is less difference in the actual amount of blue powdering than occurs in some other species. In the female the blue

powderings are simply a little more scattered and are absorbed in the dark ground instead of contrasting with it. In both sexes there is considerable variation in tint, and some females are almost uniformly deep chocolate brown, with darker transverse lines edged with gray atoms. In all such cases the white outer edging of the reniform stands out strongly. There is no other species in our fauna that can be confused with this.

A fine series of 25 males and 23 females collected by Mr. Otto Buchholz gives the greatest range of size and also the longest period of flight, from early July to the middle of August.

The spinulation of the middle tibiæ is very distinct, the spines being large and stout, though few in number, and easily discernible among the vestiture. In the male the mass of specialized scales covered by the femoral fringing forms a great wad that is very conspicuous when the middle leg is slightly moved, yet may be so closely appressed to the thorax as to be readily overlooked.

The abdominal tuftings are much reduced in this species, and in flown specimens they are likely to be totally absent. The genitalia of the male are decidedly asymmetrical, the harpes slender, irregular, and extremely unlike. The uncus is very long, slender, and has a sharply curved very pointed hook at tip.

In the female there is no apparent modification of the terminal segments on the upper side. On the underside the lobing is incomplete; the plate on the right is fully developed and takes up more than half the segment; the lobe on the left is very much smaller, and while it is fully chitinized along its inner margin, it is not well differentiated outwardly, and seems to merge into the texture of the segment. The opening to the copulatory pouch is at the upper inner margin of the right lobe, but forms no distinct tubular structure. It forms rather a space between the two lobes at that point and all from the lateral margin. There is nothing quite like this in any other of our species, and it seems in a way intermediate between the fully lobed types and such forms as *lunata*, in which there is no true lobing at all.

PHÆOCYMA NORDA, new species.

1904. *Homoptera calycanthata* DYAR, Proc. U. S. Nat. Mus., XXVII, p. 879, larva on birch.

Ground color a rich deep brown, more yellowish in the female than in the male, but varying in depth in both sexes. Head concolorous or with a gray frontal spot. Collar with a median black line, with or without an edging of bluish scales. Thorax with a more or less obvious transverse gray line across the disc and patagia behind the middle; posterior tuft well marked, sometimes a little gray-tipped. Abdominal tufts well defined in good specimens, but consisting of long upright scales which are easily disturbed and lost, so that the

majority of examples have no tufts at all; some of the scales gray tipped. In the males, primaries to the t. a. line darker brown, crossed by indistinct wavy lines; the t. a. inwardly oblique, only a little curved, quite sharply defined by a line of bright blue scales which usually extend outwardly so as to form a powdery blue fascia merging gradually into the ground color. The small punctiform black orbicular is usually included in this fascia. The reniform is lunate, elongate, nearly upright, dusky and without definite outlines. T. p. and s. t. lines run close together when both are present, but either of them may be wanting and rarely are both of them equally defined; usually one of them is black and very distinct from the inner margin, parallel with the outer margin to the middle of the wing. At that point they form a rounded angle and the t. p. proceeds a little irregularly, but on the whole obliquely to the costa a little beyond outer third, while the s. t. curves in and then out, so as to reach the costa a little before the apex. Usually it is the s. t. line that is black and most obvious toward the costal area, and usually also the costal area between these two lines is as dark as the base and darker than the rest of the wing. Beyond the s. t. line is a powdering of bright blue scales which may extend almost to the margin, interrupted at the middle by a brown shading so as to give the characteristic appearance of two lunate blue areas. At the apex is a conspicuous blackish blotch. There is a brown terminal line, parallel with the small indentations of the outer margin, and the fringes have a brown interline. Through the terminal area there are fine transverse brown strigæ that vary in number and intensity in the specimens. Secondaries brown, with inconspicuous darker transverse lines to the [illegible] extra-median line, of which the outer element is usually [illegible], conspicuous, and extends rather evenly from the anal angle to costal margin, forming a small $\gtrless$ near the upper end of its course. Beyond this line there is a powdering of bright blue scales, which usually fills most of the terminal area, which otherwise is more conspicuously strigillate with brown. There is a pale line at the base of the brown fringes.

In the female there are no blue powderings, and the maculation is on the whole much more obscurely marked. The t. a. line is rarely marked, and the dusky basal shade extends to or even beyond the middle of the wing and along the costa so as to include the reniform. The costal area between t. p. and s. t. lines is well marked and often a little purplish, and a broad shading of a similar tint is beyond the s. t. line from inner margin to the middle of the wing. On the secondaries a similar shade is beyond the extra median line, and this is sometimes traversed by lines of gray scales.

Beneath, the sexes are practically alike; smoky brown, with more or less obvious but generally vague transverse lines, and on all wings

an obvious discal spot. There is a small black dot, followed by a larger white one at each indentation of the outer margin.

Expands, 1.40–1.80 inches = 35–45 mm.

Habitat.—Kaslo, British Columbia, in May and June; Rossland, British Columbia, in early June; Arrowhead Lake, British Columbia, in May; Cartwright, Manitoba, in June.

Type.—Rutgers College Collection: cotypes U.S.N.M., Type No. 12024; also Cockle and Barnes collections.

In the fine series of examples before me, 20 males and 18 females, comprising material from Mr. Cockle, from Doctor Barnes, from the U. S. National Museum, and from my own collection, this species stands out from all its allies in the rich, dark coloring, especially of the male, in which the blue powdering is more brilliant than in that of any other species. As to the range of variation, that is, in general, similar to that of *minerea*. In the male the blue scales may be reduced to marginal lines or they may form diffuse shadings; the median space may be entirely concolorous, or it may be in whole or part paler, more yellowish than the rest of the wing. In the female the forewings may be almost uniform, or there may be a broad paler shading that takes the outer half of the median space and extends to the outer margin above the middle.

This is the species referred to by Dr. Harrison G. Dyar as *calycanthata*,[a] and the description of the early stages there given applies here and not to Abbot and Smith's species.

This is a close ally of *minerea*, and in fact is *minerea* intensified and more brilliant. It may prove to be a geographical race when the larvæ of both forms have been compared; but the fact that, with so large a series of *minerea* covering so wide a range of territory, there are none that in the male match the brilliant contrasts of *norda*, has induced me to keep this form distinct.

The sexual characters are on the whole very much like those of *minerea*; in fact, the small differences in detail that do appear I would consider within the range of specific variation in both sexes.

HELIOCYMA MINEREA (Guenée).

1852. *Homopteva minerea* Guenée, Spec. Gen., Noct., III, p. 15, pl. XVIII, fig. 6.
1857. *Homopteva minerea* Walker, C. B. Mus., Het., XIII, p. 1054.
1857. *Homopteva obliqua* Walker, C. B. Mus., Het., XIII, p. 1054.
1865. *Homopteva minerea* Bethune, Canadian Journal, X, p. 264.
1865. *Homopteva albofasciata* Bethune, Canadian Journal, X, p. 266.
1865. *Homopteva minerea*=*obliqua* Walker, not Guenée, Grote and Robinson, Trans. Am. Ent. Soc., II, p. 79.

Varies in color from tawny yellow to chocolate brown, marked and shaded with darker brown or black. Head concolorous. Collar with

[a] Proc. U. S. Nat. Mus., XXVII, 1904, p. 879.

a median black line and usually a slightly darker shade below tip. Thorax with three dusky brown transverse lines, the one behind the middle often edged with blue-gray scales. Primaries with usually a more or less mottled appearance; basal area darker as a rule and the triangular costal area between t. p. and s. t., lines usually as dark or darker than any other portion of the wing. Basal line usually traceable, sometimes evident, geminate, in the male often picked out by bluish white scales. T. a. line best emphasized by the difference in shade between basal and median space: rarely geminate, the lines black edged, interval brown; often a pale line separates off a narrow band from the rest of the basal space; in course inwardly oblique, only a little irregular or outcurved. In the male there is usually a pale blue edging beyond the line which may expand into a rather broad fascia. Median space usually a little paler than the rest of the wing, but it may be concolorous in either sex. As a rule there are three transverse undulating dusky lines which tend to darken the space a little at or before the middle, leaving the outer portion paler; quite usually also there is a darker brown shade over the costal area. T. p. line geminate, very fine, rarely black and then tending to lose the outer portion; in course outwardly oblique to the interspace between veins 6 and 7, there acutely bent, making a deep incurve followed by an equal outcurve and then oblique, evenly sinuate to the inner margin. S. t. line inwardly oblique from costa to vein 5, then outcurved and parallel with the t. p. line for the balance of its course. From the costa to vein 7 it is edged with black inwardly, and the space to the t. p. line is dark brown or even blackish; to vein 4 the line is interrupted or feebly marked on the pale ground, and below that point to the inner margin it is often black and conspicuous. Over or beyond this line, especially in the female, a dusky or blackish shade may extend from inner margin upward to the angle of the line and then outward on or below vein 4 to the outer margin, interrupting the terminal space and forming a break for the pale median shade to extend outward to the margin. In the male this shade may be powdered with bluish white, or there may be a lilac blue line, or the entire terminal area may be bluish, interrupted always by the dark shading on or below vein 4. There is a dusky terminal line which may be broken and partly lunulate and is sometimes preceded by brown or bluish dots. The fringes are interlined with pale at base and darker at middle. Orbicular a black or brown dot which is often wanting. Reniform rather small, lunate, dusky, without defining lines as a rule. Secondaries usually a little paler basally, the disk crossed by a series of lighter and darker transverse, somewhat undulated shade lines. A distinct, slightly incurved and slightly irregular black line, outwardly pale edged, continues the s. t. of primaries. The terminal space in the male is usually more

or less blue shaded or powdered; in the female it may be merely strigillate or there may be a dusky band similar to that beyond s. t. line on primaries. Beneath powdery, with linear discal spots on all wings; primaries with median and an extra median transverse shade lines, secondaries crossed by several undulating lines.

Expands, 1.60–1.88 inches = 40–47 mm.

Habitat.—Canada to Florida along the Atlantic coast; west to the Rocky Mountains; Arizona.

Dates in the more northern part of its range are May, June, and July, the latter usually worn females; from the Southern States there are specimens in August.

A series of over one hundred examples, representing the entire range of distribution, is before me and gives an excellent chance to determine the extent of variation. This is aided by a series of 27 specimens from one locality in the Catskill Mountains, taken by Mr. R. F. Pearsall, which shows that the entire geographical range may be matched within the limits of a single locality.

At first sight it seems almost hopeless to attempt to describe these variations; but if we separate the sexes, we find that they group into types. Taking first the males, we have those in which the terminal space is divided into two lunate bluish areas, and these usually have the anterior portion of the median space also blue powdered. Then come the less contrasting forms in which the blue is reduced to an edging, or it may be an almost continuous line, as in the example that formed the type of Doctor Bethune's *albofasciata*. With either of these forms there may occur examples that have the median space much paler than the rest of the wing. In the female the range is somewhat less because the blue is eliminated. We have forms that are almost evenly blackish except for a light sub-apical shading, and forms that have the median space contrastingly paler, and everything in between. Throughout it all, however, the species remains characteristic and specimens from New York and from Arizona are placed with equal readiness.

The spinulation of the middle tibia is distinct, though not conspicuous, and sometimes there is a spinule or two between the spurs of the posterior pair. The tufting on the middle femora of the male is obvious and the mass of specialized scales is large and conspicuous.

The genitalia of the male are moderately asymmetrical, the left harpe much broader at base and narrowing abruptly into an elongate flattened process; the right much more elongate, narrower throughout. I have examined specimens of the most divergent appearance superficially, and from the extremes in geographical range, without discovering any material departure in form.

In the female the depressions on the upper surface are usually well marked and the terminal segments are usually more or less

marked with ocherous. Beneath, the lobes are approximately equal, the opening of the copulatory pouch at the upper inner angle, taking in the angle itself and not any material portion of either upper or inner margin.

PHÆOCYMA LUNIFERA Hübner.

1818. *Phœocyma lunifera* HÜBNER, Zutræge, p. 19, figs. 97, 98.
1818. *Phœocyma lunifera* HÜBNER, Verzeichniss, p. 275.
1857. *Phœocyma lunifera* WALKER, C. B. Mus., Het., XIII, p. 1045.
1865. *Phœocyma lunifera* BETHUNE, Canadian Journal, X, p. 249.
1875. *Homoptera penna* MORRISON, Proc. Bost. Soc. N. H., XVIII, p. 241.
1878. *Phœocyma penna* GROTE, Bull. U. S. Geol. Surv., IV, p. 185.
1893. *Homoptera penna* SMITH, Bull. 44, U. S. Nat. Mus., p. 371.

Ground color a dirty luteous gray or brown, more or less tinted with red brown. Head with a brown or black frontal line. Collar with a more or less obvious black or brown medial line. Thorax with obscure transverse light and dark alternating shades. Abdomen gray to luteous, the dorsal tuftings small. Primaries with the transverse markings usually distinct and the s. t. line, at least, black and contrasting. Basal space usually darker and sometimes contrastingly so. Basal line marked in some specimens; usually as a dark shade between pale marginal lines. T. a. line always obvious, geminate, brown, the intervening space tending to darken so as to form a band, and in such case often preceded by a paler line. Median space usually paler at the t. a. line than elsewhere, and darkening from the middle outward; but it may be absolutely concolorous, may have a pair of nearly upright diffuse median lines, or may be simply washed with darker outwardly. Orbicular a black or brown dot, distinct in some of the specimens. Reniform of moderate size, lunate, uniformly dusky or blackish, edged with yellowish scales. T. p. line slender, threadlike, usually black, tending to become lost inferiorly, outwardly bent over cell, roundedly indented opposite reniform, thence from vein 4 inwardly oblique and sinuate to the margin. S. t. line black, usually complete, sometimes broken opposite the reniform and occasionally obscure toward costa. It is irregular and a little denticulate in the upper part of its course, forming an incurve from costa to vein 4, where it is outwardly dentate and carried to vein 3, where it reaches the greatest outward bend, thence more evenly to the inner margin. The s. t. space is more or less completely dark-filled; sometimes entirely, so as to form a distinct band, sometimes only at costa to form a dark triangular blotch, and sometimes the dark shading extends inward into the median space. Usually the lower half of the line is broader and more conspicuously contrasting. The terminal area may be concolorous, which is the rule in the females; it may be more or less powdered with bluish gray, forming an obscure band, and that is more common in the males; there may be a dusky shading

beyond the lower half of s. t. line extending to the outer margin from the outward indentation of the s. t. line, and that is not common in either sex. There is usually a dusky apical shade and a yellowish line at base of fringes. Secondaries a little paler at base than primaries, disc crossed by two or three dusky shade bands that sometimes form an obscure fascia. An extra-median double line, the inner slender and often brown, the outer conspicuous, black, inwardly diffuse. The lines diverge toward the costa and the space between them tends to become and sometimes is completely dark filled. The terminal space may be concolorous, may have a bluish gray band through its middle or a leaden gray shading. Beneath dull yellowish, more or less powdery, ranging from almost immaculate to forms with a discal lunule, a median dusky line and a t. p. and s. t. line on all wings.

Expands, 1.40–1.64 inches = 35–41 mm.

Habitat.—Massachusetts to Texas, west through the Central States and probably to the Rocky Mountains.

This is one of the several different forms that has been in collections as *calycanthata*. It is sometimes named *penna* Morrison, correctly enough, and occasionally *galbanata* Morrison, which is not so far out of the way. As a matter of fact I believe this to be the form that Hübner had before him and that served as the original of his figure in the Zutræge. Careful comparison shows that no other species answers all the requirements of the figures and that this species does do so in all save a few minor details that are within range of artistic error. Those very points which Mr. Morrison emphasizes in his description of *penna*, notably the dark filling of s. t. space, are well brought out by the figure, and so is the dusky basal area. I have never seen any specimen with quite so well marked a yellow ring around the reniform, but examples with a yellow edging are not infrequent. The irregular s. t. line with the little dents on veins 3 and 4 is quite characteristic, and the secondaries I can match perfectly in the series before me.

The species figured under this name by Guenée is *cingulifera* Walker, the mistake occurring through too great a reliance on the dark basal area and pale reniform. Guenée seems not to have had anything like the real species before him.

As to the range of variation, that is considerable in both sexes, and puzzling when it comes to making a separation from *lineosa* Walker. In the typical form the basal and s. t. spaces are dark and there is an upright median shade which fades outwardly. In such cases there is usually a paler terminal area, and, in the male, more or less blue powdering, so that there may be a resemblance to *ménersa* or yet more to the *colorado* or *rubi* type. In rare cases there is a heavy inward darkening from the s. t. space on both wings, leaving a pale band beyond the t. a. line, which gives those examples a very unusual

appearance. The median space may be entirely uniform, and in that case there is often a dark shade band beyond the lower half of the s. t. line from the angle of which a dark shade may extend to outer margin. When this is accompanied by a dark apical blotch we have two large pale terminal lunate areas as is characteristic in *lunata* and *minerea*. The extreme in the other direction comes when the wings are very uniform, without contrasts, and only the t. p. and s. t. lines stand out in whole or part, black and contrasting.

Just where to draw the line between this form and *lineosa* becomes puzzling and a matter of nice judgment, particularly when the species occur together at the same time and are taken under absolutely identical conditions. I can find no tangible structural difference of any kind between them and I have arranged them to show a full line of intergrades from one to the other; yet the line is unsatisfactory and the arrangement into two series is on the whole most satisfactory. I believe there are two species. I admit my inability to separate them by any positive characters. *Lunifera* is on the whole a smoother species, less strigate, less obviously crossed by undulating darker shades, and with more definite ornamentation throughout.

The middle tibiæ are set with a moderate number of rather long spinules, easily seen, and the middle femora of the male have the mass of specialized scales very large and the tufting conspicuous.

The male genitalia are distinctly asymmetrical, both harpes very much curved and forked at tip, but in a totally different way, as appears by a reference to the figures. The uncus is very long and slender and is a little sinuate toward the tip, which is acute and a little hooked.

The females have the impressions of the upper surface of penultimate segment well marked and the tufts a little discolored. On the under side the segment is distinctly lobed, the lobes not markedly different, yet sufficiently so to be characteristic. The opening to the copulatory pouch is from the upper inner angle and comes from the angle itself rather than from either upper or lateral margin.

PHÆOCYMA LINEOSA (Walker).

1857. *Homoptera lineosa* WALKER, C. B. Mus., Het., XIII, p. 1056.
1865. *Homoptera lineosa* BETHUNE, Canadian Journal, X, p. 259.
1875. *Homoptera galbanata* MORRISON, Proc. Acad. Nat. Sci. Philadelphia, 1875, p. 435.
1878. *Pheocyma lunifera* ‡ GROTE, Bull. U. S. Geol. Surv., IV, p. 185.
1880. *Pheocyma lunifera* ‡ GROTE, Can. Ent., XII, p. 87.
1898. *Homoptera lineosa* (=*lunifera* GROTE, not HÜBNER) SMITH, Bull. 44, U. S. Nat. Mus., p. 368.

Ground color a rather uniform pale or creamy gray, tending to reddish brown. Head with a variably evident frontal line, collar

with a blackish transverse line at middle. Thorax with obscure paler and dusky transverse lines, which are rarely well marked and often obsolete. Abdomen of the palest ground color, the dorsal tuftings small. Primaries having a powdery or dusty appearance, more or less strigate and with rivulous dusky lines that obscure all the maculation and undoubtedly suggested the name *lineosa*. None of the lines distinct or black and none of the markings contrasting. Basal area quite usually a little darker than the median space; the basal line geminate, brown, diffuse; t. a. line geminate, brown, sometimes preceded by a paler line or outwardly edged with darker followed by gray scales. The median space is usually a little paler basally; at middle and beyond crossed by two or three dusky shade lines. T. p. line very slender, brown or black not contrasting, outwardly bent over reniform, angularly and usually well indented opposite reniform, oblique and sinuate from vein 3 to inner margin. S. t. line brown, a little diffuse, incurved from costa to the interspace between veins 3 and 4, there with a rather well marked outward tooth, below that inwardly oblique and a little sinuate rather than incurved. Beyond this there may be a more or less defined yellow shade line, a dusky band beyond lower half, a dusky outward shade from angle of line to outer margin, or there may be only an obscure strigillation. Very often there is a slight apical shade and in the male there is usually more or less bluish gray in the form of shading or powdering. There may or may not be a brown terminal line, with the incisions pale marked and the veins dark tipped. There is usually a dull brown, punctiform orbicular, and the reniform is dark, lunate, more or less edged with yellowish. The secondaries are paler at extreme base, the disc crossed by a series of alternate paler and darker undulating lines, of which either series may be the more prominent. The exterior line is best marked, narrow, black, or edged with black scales, not conspicuous, outwardly followed by a yellow or whitish line. The terminal area is usually more or less blue or violet-gray powdered, tending to form a band in the male, sometimes changed to a leaden gray band. Terminal line as in primaries. Beneath yellowish brown, powdery, primaries with a large, secondaries with a small, discal spot, both wings with an irregular extramedian line.

Expands, 1.32–1.60 inches=33–40 mm.

Habitat.—Canada to Texas, west to Colorado; Kansas, New Mexico, Winnipeg, Manitoba. Dates range from the end of May to August.

I have a long series of specimens from the various collections, representing the entire range above given, and some very good local collections, notably one of 24 males and 28 females from Dr. O. S. Westcott, collected near Chicago in May and June. In this series

were 8 males and 15 females that were separated out as representing the true *lunifera* and which gave opportunity to study local variation.

In ground color the variation is from very light creamy gray to a rusty brownish gray; the latter more general in the specimens from the southwest (Texas), which are also notably larger. *Galbanata* Morrison is based on one of the neatly marked gray forms.

The difference between the sexes is not uniformly marked and it is not always possible to separate them from the wing characters alone; nevertheless, as a rule, there is more gray powdering in the terminal space in the males than there is in the females, and in size the female usually exceeds the male.

Typical specimens have no sharply defined lines or marks and the wings seem to be crossed by a mass of slightly undulating dusky lines. From that point variation runs to forms which it is not easy to differentiate from some forms of *lunifera*.

In structure of legs and in the male and female genitalic characters I can find no substantial differences; in fact, the northern gray and southern red forms actually show more divergencies than do the typical *lineosa* and *lunifera*. Yet for reasons already given I have preferred to hold the species distinct.

PHÆOCYMA UNILINEATA (Grote).

1876. *Homoptera unilineata* GROTE, Can. Ent., VIII, p. 108.
1883. *Homoptera unilineata* GROTE, Can. Ent., XV, p. 123.
1903. *Homoptera unilineata* HOLLAND, Moth Book, p. 278, pl. XXXVII, fig. 14.

Ground color rusty yellow or leather brown, more or less washed with gray. Head usually deeper brown. Collar sometimes steel gray just below tip. Thorax with three vaguely marked transverse dull gray bands which are often obsolete. The posterior tufting is unusually thick and the patagia are divergent and alate in well preserved specimens. Dorsal tufts of abdomen very small, and in flown examples are more often altogether absent. Primaries rusty in appearance, more or less strigillate or powdered with dark brown or even blackish scales; sometimes arranged so as to form a series of vague discal transverse lines. Basal space usually a little darker, a narrow pale line separating off an outer band which serves as the t. a. line and may be itself outwardly edged with paler scales. Orbicular a small black dot, visible in most specimens. Reniform narrow, upright, a little lunate, small or moderate in size, dusky, usually not outlined, but sometimes edged with rusty or yellowish scales. The t. p. and s. t. lines are united for most of their course, and between vein 6 and the inner margin there is an even narrow yellow line, outwardly bordered by a rusty brown line. This forms an obtuse outward angle between veins 3 and 4, and above vein 6 it divides, the t. p. line running obliquely inward to the costa, while the s. t. line continues its course a

little outward to the costa. The triangular area thus inclosed is often darker than the rest of the wing and forms its most conspicuous feature. There is a tendency to a dusky shade band beyond the s. t. line, and the terminal area becomes more gray, forming the palest portion of the wing. There is a narrow brown terminal line followed by a yellow line at base of fringes, and from the terminal line a series of rays extend into the interspaces, giving the whole a crenulated appearance that intensifies the denticulate appearance of the outer margin. Secondaries a little paler and less powdery; three vague dusky shade lines crossing the disk before the conspicuous black extra-median line, which is usually not extended above vein 6. Terminal area concolorous, the terminal brown line and pale line at base of fringes being as a rule continued from primaries. Beneath pale yellowish brown, powdery, without obvious markings in most cases; sometimes with a discal spot, rarely with transverse lines.

Expands, 1.60–1.92 inches=40–48 mm.

Habitat.—Canada to the District of Columbia, April and May.

A series of 8 males and 15 females is at hand representing, as actual points of capture, New Hampshire, Webster, May 12–16; New York, Center, May 12–17; Long Island, May 14; New Jersey, no specific localities nor dates; Washington, District of Columbia, April 15–22; Iowa, May 9 and 22, no specific locality. There is, on the whole, little variation; some specimens are darker than others and some are much more powdery, one Iowa example becoming almost steel gray to the terminal space. There is more or less contrast in the basal space and the costal area between the t. p. and s. t. lines is sometimes conspicuously the darkest part of the wing.

The species is one of the most characteristic of our fauna; the unusually elevated or alate patagia, the strongly dentate outer margins, and the conjoint t. p. and s. t. lines form a combination that seems unmistakable.

In the male the femoral tufting on the middle leg is not conspicuous; but the femur is excavated, there is a fringing on both sides, and there is a mass of specialized scales. As a whole the legs are stout, the spines of the median pair being long and arranged in a series along the sides.

The sexual parts of the male are symmetrical or nearly so. The uncus is slender and has a long drawn-out, curved point. The lateral pieces are slender, hooked like the uncus itself, and somewhat dilated toward the tip. The penis sheath is almost semicircular in outline. The anal plates of the female are nearly symmetrical, the opening to the copulatory pouch from the upper inner angle of the right half as seen from below, but from the upper margin itself.

The species does not seem to be abundant anywhere.

PHÆOCYMA OBLIQUA (Guenée).

1852. *Homoptera obliqua* GUENÉE, Spec. Gen., Noct., III, p. 16, pl. xv, fig. 7.

Ground color mouse gray to fawn brown, more or less washed with blue gray. Head usually a little more brown. Collar and thorax concolorous; posterior tuft sometimes brown tipped, as is also the large tuft at base of abdomen. Dorsal tufts of abdomen distinct in well preserved specimens, and sometimes white tipped. Primaries with a wash of violet gray over the entire surface, more or less marked; lines usually traceable, but none of them black or contrasting. Basal space usually a little darker, and the outer edge of this is often bordered by darker brown scales forming the t. a. line; there is an outward tooth on the subcostal and below this the line while inwardly oblique is a little outcurved in the interspaces. Beyond the t. a. line is the palest area of the wing, extending to an upright or slightly angulated median shade beyond which the space is a little more brown. Orbicular small, punctiform, brown. Reniform lunate, usually diffuse, sometimes brown and fairly well defined but not outlined, followed by a more or less obvious rusty reddish shading. T. p. line slender, brown, tending to become lost, sometimes preceded by a cinerous shade; inwardly angulate opposite the reniform and not much incurved below the cell; outwardly a little shaded with brown toward costa in some specimens. S. t. line obvious only below vein 4, thence to the inner margin parallel with and close to the t. p. line, but darker and better marked, sometimes emphasized by black scales. The upper part of the line is usually traceable by a line of gray or brown scales or by both, but in many cases it is entirely lost. The terminal area is more or less mottled with gray, strigillate, and sometimes there is a darker shade beyond the visible portion of the s. t. line. There may or may not be a brown terminal line, with pale dots at the incisions. Secondaries usually with two, sometimes with three visible transverse shadings on disk before the distinct brown band which extends from anal angle with a slight incurve to costa just within the apex, becoming much less obvious as it approaches the costa. The outer portion of this band is determinate, edged by brown or black scales, and often followed by a yellowish line; the inner portion is more or less diffuse in most specimens. The terminal area is usually without markings, a terminal line being occasionally present. Beneath dull yellowish to pale brown, more or less powdery, with or without discal spots or extramedian transverse lines on all wings.

Expands, 1.48–1.92 inches=37–48 mm.

Habitat.—New York to Florida and probably throughout the Atlantic coast region to Canada and westward to the Mississippi. Specific localities are: New York, Center, April 29–May 28, Long

Island; Pennsylvania; Washington, District of Columbia, May 19, 24; North Carolina, Raleigh, July 25; Florida, Seven Oaks in September; Missouri.

In the series before me there are 9 males and 12 females and they are, after all, very much alike. There is a little difference in the amount of contrast between the various spaces and a little difference in the ground color; but over all is the gray wash that is characteristic of the species and which no other has in the same way.

In the male the middle femora have the sexual tufts distinct but not really conspicuous, inclosing a large mass of specialized scales. The spinulation of the median tibiæ in both sexes is scanty and not conspicuous.

The genitalia in the male are markedly asymmetrical, the lateral process or harpe of the right side as seen from above being markedly shorter and more slender than that of the left, which also has an accessory process which curves from the lower margin upward on the inner side and shields the base of the uncus.

In the female the anal segments tend to become ocherous and the depressions on the upper surface are very well marked. The lobes of the divided segment beneath are very dissimilar in form and the entrance to the copulatory pouch is shifted to the outer upper angle of the right plate.

This appears to be the most abundant of the species of this series.

PHÆOCYMA METATA, new species.

Light fawn brown tending to gray, the primaries more or less washed with gray. Head and thorax immaculate. Abdomen tending to more yellowish or rusty. Primaries with the basal space usually a little darker. Basal line traceable in some specimens, but never black, distinct. T. a. line usually marked only by the difference in tint between basal and median space, sometimes a little more defined by an edging of dark scales; never a black line; in course outwardly dentate on subcosta and then with a slight and tolerably even outcurve to the inner margin. Beyond this line there is a broad band-like area to the middle of the median space that is usually lighter than the rest of the wing and is gray powdered, the punctiform blackish orbicular visible in most cases. At the middle is a somewhat irregular median line and beyond that the space may be evenly deeper in tint or there may be two other diffuse lines crossing it. The reniform is moderate in size, lunate, dusky or in a few cases even blackish; beyond it a more reddish shading to the t. p. line. The t. p. line is usually distinct enough from costa to the middle of the wing, indented as usual opposite the middle of reniform, and it is lost or very obscurely marked toward the inner margin. The s. t. line is distinct, black, or blackish between vein 4 and the inner margin, forming an even curve; but between costa and vein 4 it is altogether lost, marked

by a little contrast between s. t. and terminal spaces only, or rarely by an edging of darker or paler scales. Beyond the s. t. line is a dusky somewhat glaucous band or shade, best marked opposite the angulation of the line and usually distinct to the inner margin, while toward the costa it is lost before it reaches the apical area. There is a tendency toward strigillation of the terminal space and toward a series of pale terminal spots. Secondaries with a black extra-median line extending from anal angle almost to costa well within the apex. This line is usually edged with yellowish scales or a yellowish line outwardly, and with a brown shade inwardly, in some cases forming a real band that extends from the angle to vein 5. There is a tendency to a bluish powdering in the terminal area, which is best marked in the males. Beneath, yellowish brown, powdery, secondaries usually with a discal spot. Sometimes the primaries also have such a spot and occasionally a transverse line will be traceable, usually on the secondaries.

Expands, 1.60–1.80 inches=40–45 mm.

Habitat.—Center, New York, in May; Pennsylvania; Washington, District of Columbia; Tryon, North Carolina, in August; Virginia; Florida.

Types.—Coll. U.S.N.M., Type No. 12025; also Rutgers College Collection.

Four males and six females are at hand; all very similar, yet exhibiting a considerable range of variation. As a whole the males are a little more brilliant and better marked than the females, one of the latter having almost no contrasts. There is quite a bit of difference in the reniform; but it is always darker than the ground and never quite black. The terminal area usually shows the dusky band distinct, but even that may disappear almost entirely. In the definition of the median shade there is every range between distinct and almost entire uniformity; but the latter is exceptional.

The spinulation of the middle tibia is scattering and not conspicuous in either sex; in the male the spines are not easily found in the dense vestiture. The tufting of the middle femora in the male is quite distinct and there is a large mass of specialized scales.

The genitalia of the male are distinctly asymmetrical, the lateral processes or harpes of the right side being much more curved and slender than those of the left, while the left side has the same sort of supplemental piece found in *obliqua*, except that it is here narrower and longer, and rounded at tip; altogether a smaller and less conspicuous structure.

In the female the depressions on the upper side of the anal segment are well marked and sometimes the segment is ocherous. On the under side the lobes are not markedly dissimilar and the opening to

the copulatory pouch is at the upper inner angle of the right lobe, taking in the angle itself and not either side or top alone.

This species is one of those that has been confused with *obliqua* and is very like it. Superficially it lacks the gray washing, and while this does not seem very much of a distinction, yet a comparison of two series shows a very marked difference in appearance. It also averages smaller in size, although the smallest *obliqua* is smaller than any of my *metata;* but the average *obliqua* uniformly exceeds the average *metata.* The tranverse marking is more conspicuous and the reniform more contrasting and these factors when added to the lack of gray wash give a characteristic appearance that is recognizable. Finally, and this of course is the determining factor, the genital structures of both sexes shows obvious differences, less marked, perhaps, in the male than in the female, where the character of the lobes and the location of the opening of the copulatory pouch are quite different. A comparison of the figures will make this point more clear.

PHÆOCYMA CUREMA, new species.

Varies from fawn to mouse gray, the base being a light red-brown, more or less overlaid by a wash of blue-gray; the vestiture even, not rough or velvety. Head and thorax concolorous; head sometimes a little darker brown, and collar sometimes a little more rusty than the general ground. Abdomen more rusty brown, the dorsal tufts small but conspicuous when they are not altogether lost. Primaries rather even in color, without strong contrasts, the transverse maculation clean cut. Basal line single, black, distinct. T. a. line single, narrow, usually black and distinct, irregular, an outward tooth on the subcostal and a long inward angle on the median vein. T. p. line often obsolete, sometimes only partially traceable, brown and thread-like, rarely distinct throughout its course, and only occasionally black. In course it has the usual exsertion over the reniform, with an inward angulation opposite the middle of cell, and the deep incurve, parallel with the s. t. line, below it. S. t. line usually black and distinct through the lower part of its course, but above the angulation at its middle it is indistinct, marked chiefly by the margin of the darker s. t. space. There is more or less gray powdering in the terminal space, but there is no terminal line and the fringes are uniform. The basal portion of the median space is usually a little the palest portion of the wing, and is limited outwardly by a straight shade line that is scarcely darker in most examples and never distinct, marking the edge of the somewhat darker portion of the median space. No trace of an orbicular in any specimen. Reniform lunate, usually black, contrasting, always obviously darker than the ground, and beyond it is a rusty red shade which extends to the t. p. line or the place where it should be. Secondaries somewhat duller in color

than the primaries, without traceable transverse maculation until the distinct, narrow, black extra median line is reached. This is most distinct toward the inner angle, does not reach the costa and is outwardly edged by a bluish-gray line or by a more diffuse shading of blue-gray scales. In the male there is a tendency to a whitish blotch at the anal angle, and on the primaries this is a rather conspicuous feature in nearly all the examples at hand. Beneath, dull smoky brown, powdery, with a more or less obvious discal lunule on all wings, and a tendency to a pair of transverse lines which are not often distinct.

Expands, 1.48–1.68 inches=37–42 mm.

Habitat.—Center, New York in May; Pennsylvania; Kirkwood, Missouri, March 25; Raleigh, North Carolina, in May, and Tryon, North Carolina, June 4; Seven Oaks, Florida, in September. Palm Beach, Florida, in March.

Types.—Coll. U.S.N.M., Type No. 12026; also in collections of Barnes and Rutgers College.

In the series of 5 males and 7 females now before me there is very little variation. Two of the Floridian examples diverge in the direction of a more defined median shade and a little more hoary washing; but they do not cause any conflict with any other species, the characteristic features of the present one being well marked.

The spinulation of the middle tibiæ in both sexes is scant and easily overlooked in the vestiture, although the individual spines are long. In the male it is difficult to see them at all, *in situ*, and even in the mounted preparation they are not conspicuous.

The tufting of the middle femora in the male is not at all conspicuous and is easily overlooked; but there is an obvious excavation on the inner side filled with the usual specialized scales, although in bulk it is small compared with some of the allied species.

The genital structure is distinctly asymmetrical, the left lateral piece or harpe being distinctly longer, broader, and less curved than the right, which is a little enlarged toward the tip.

In the female the upper side of the terminal segment has the impressions very distinct, but not discolored in any of my examples. Beneath, the lobes are distinctly marked, the right a little the larger, while the opening to the copulatory pouch is at the upper inner angle of the right lobe and on the inner rather than the upper margin.

This is the dullest and darkest of the species with smooth vestiture, and distinct from its allies in the conspicuous black reniform and single, well-defined black basal and t. a. lines. The males have a conspicuous white patch at the anal angle of primaries, and as a whole there is little doubt as to the location of any individual.

Its nearest ally is *metata*, and this is also indicated by the genital structure of both sexes. But even here there are obvious distinctions which bear out the superficial differences. In the males the right

clasper of *curema* is materially broader than in *metata*, and instead of terminating in a slender, rounded tip, it broadens and becomes more spatulate in character; the left clasper in *curema* is both longer and broader and the tip is not drawn out to a point. In the female *curema* the lobes of the anal plates are decidedly smaller and different in outline, while the left lobe is the larger, instead of the right, as in *metata*. The opening to the copulatory pouch is in approximately the same location, and in general the appearance of the structure is very similar.

Considering all the differential features, structural as well as superficial, I have concluded it best to consider that we have a distinct species to deal with.

PHÆOCYMA HELATA, new species.

Ground color dull smoky brown. Head and thorax more or less powdered with gray scales, forming no distinct markings. Abdominal tufts prominent. Primaries obscured by irregularly disposed brown shadings. Basal area darker. Basal line black, diffuse. T. a. line black, inwardly diffuse and margined by a brown shading; acutely toothed on the subcostal and with an obtuse or rounded outward angulation just above the submedian. At the center of the wing begins a series of three or four more or less obvious, somewhat diffuse transverse lines that darken the outer portion of the median space. The brown, punctiform orbicular is present in most examples. Reniform lunate, blackish, conspicuous. T. p. line distinct in all specimens, black, narrow, complete, outwardly bent over cell and strongly indented toward the middle of the reniform, the outward angles rounded; incurved below cell and only a little irregular. S. t. line obvious throughout its course, distinct and black only from vein 4 to the inner margin. There is a little outward tooth on veins 3 and 4, and between these veins a blackish shade extends to the outer margin. The space between t. p. and s. t. lines is irregular and is darker filled, most distinctly so on the costal area, giving the appearance of an irregular band. The terminal area is strigillate and more or less powdered with gray scales in both sexes. In the male there is a conspicuous white blotch at the anal angle. Secondaries dull, fuscous brown to the extra-median black line, which is prominent at anal angle but does not reach the costa. This line is outwardly edged by a gray line and by some gray powderings which become more conspicuous toward the anal angle; inwardly the line is edged by a brown shade, which may merge into the ground or may be limited by a brown line for part of its course, so as to form a distinct band part way across the wing. Beneath yellow brown, more or less powdery, all wings with a discal spot; primaries with an extra-median, secondaries with basal and extra-median transverse

lines more or less obvious; in some examples only the discal spots are distinct.

Expands: 1.40–1.60 inches=35–40 mm.

Habitat.—New Hampshire, probably Webster; Center, New York, in May; Brooklyn, New York; Amherst, Massachusetts.

Types.—Rutgers College Collection; also cotype Doctor Ottolengui.

Three males and two females, all very much alike. The chief superficial difference between the sexes is the conspicuous white blotch at the anal angle of the primaries; but with more material this may not prove constant.

As compared with *curema*, to which this is perhaps most nearly allied, the most obvious difference is the more roughly powdered vestiture and the absence of a red tinge in the ground. Next the fact that both t. p. and s. t. lines are complete, and the space between them is darker. All the transverse maculation is more conspicuous, and the median shade lines are as a rule better defined.

The spinulation of the median tibia is well defined but sparse, the long spinules being easily made out in the vestiture. The femoral tufting of the male is only moderate, and the mass of specialized scales is not at all conspicuous.

The genitalia of the male are very similar to those of *squammularis* and differ more from those of *curema*, to which the species is nearer on superficial characters. The right clasper is unusually long, slender, and down-curved.

In the female also the resemblance is to *squammularis* rather than *curema*, though there is a markable difference in the outline of the lobes beneath. The location of the opening to the copulatory pouch is about the same—at the upper inner angle of the right lobe; but it is distinctly nearer to the middle of the segment as a whole.

PHÆOCYMA SQUAMMULARIS (Drury).

1770. *Noctua squammularis* DRURY, Illustr., I, p. 18, pl. IX, fig. 3.
1857. *Noctua squammularis* (=*coracias* Guenée) WALKER, C. B. Mus., Het., XIII, p. 1075.
1865. *Anthracia squammularis* BETHUNE, Canadian Journal, X, p. 248.
1874. (? *Noctua squammularis*=*coracias*) GROTE, Bull. Buff. Soc. Nat. Sci., II, p. 46.
1898. *Pseudanthracia squammularis* SMITH, Bull. 44, U. S. Nat. Mus., p. 378.

Pale leather brown, more or less washed with gray. Head usually a little darker in front. Collar and thorax concolorous. Primaries with all the maculation distinct, conspicuous, the transverse maculation well marked, brown or black. Basal space a little darker, basal line distinct, single, brown or black; t. a. line distinct, single, brown or black, with an acute outward tooth on the subcosta and usually a

marked outcurve in the submedian interspace. Beyond this line is a broad gray area extending to the median shade, and this is the palest part of the wing, including the small, punctiform, brown orbicular. The median shade consists of a pair or three somewhat wavy brown lines, more or less obscured by the deeper brown shading that extends to the t. p. line. Reniform brown or black, lunate, not defined, followed by a more reddish shade. T. p. line black or brown, sometimes complete, more often partially lost below the middle, with a deep inward angulation opposite cell, forming an obvious ≶ and a moderate incurve below the cell. S. t. line black below the middle, tending to become lost above that point. When complete, it starts from the costa within the apex, makes a moderate incurve and forms an acute outward tooth on vein 4; there is a smaller tooth on vein 3, and then there is the usual incurve to the inner margin just within the anal angle. There is a tendency to darken the s. t. space which is best marked in the costal region. Beyond the s. t. line there is a broad dark band extending from inner margin to the angle of the line, interrupted in the male by a whitish blotch; otherwise the terminal space is gray powdered, more or less strigillate. There is no obvious terminal line. Secondaries with three more or less obvious brown lines across the disk, followed by a brown band between black or brown defining lines. This band becomes broader and is less marked toward the costa and the inner line is much less distinct. Beyond the outer line is an edging of pale scales or even a complete whitish line and the terminal area toward anal angle tends to become gray powdered. Beneath, pale gray-brown, powdery, with a discal lunule and extra-median line on both wings, occasionally an obscure discal line and sometimes a short line above anal angle.

Expands, 1.48–1.60 inches=37–40 mm.

Habitat.—Pennsylvania; Maryland; Washington, District of Columbia, "Pupa found, Iss. March 2, 82."

Three males and two females, labeled as above and all very much alike. The species resembles a miniature *obliqua* with all the maculation intensified and made more contrasting. This expresses the chief superficial differences, added to the absence of the violet gray wash and the presence of the white blotch near anal angle of primaries in the male. It is the intermediate step to *benesignata*, being less powdery and much less contrasting in maculation than that species.

The spinulation of the middle tibia is fairly well marked in both sexes, less visible in the heavier vestiture of the male. In the latter the middle femora are obviously tufted and the mass of specialized scales is quite large.

The male genitalia are moderately asymmetrical and very like those of the related species, the right clasper or harpe being much

more slender and more curved than the left. A comparison of the figures will better bring out the differences than any description.

In the female the indentations on the upper surface of the anal segment are well marked. Beneath, the lobes of the anal plate are large and well marked, the left being conspicuously larger than the right. The opening to the copulatory pouch is at the upper inner angle of the right plate and is all from the upper margin, differing markedly in position from that of *obliqua*, to which the species has the greatest superficial resemblance.

This species is listed in our catalogues as a synonym of *Pseudanthracia coracias* Guenée, a name of much later date, and Walker is responsible for the original identification. Mr. Grote, while he followed the reference, doubted its correctness, and I made no changes from lack of better information in 1893. In 1891 I found that the *squammularis* of Walker as represented in the British museum was *Ypsia undularis*, a small, flown example of which might readily be mistaken for *coracias* as figured by Guenée.

Reference to Drury's figure indicates a species the original of which could not possibly have been the *coracias* of Guenée, although neither does it represent at all accurately anything else in our fauna. But the description helps:

> Alis cinereis, antice fascia irregulari centrali ferruginea, lineis duabus externa cincta, posticis fasciis duabus obscuris.

The expanse is given as 1.75 inches and the habitat as New York, May 11.

In the Westwood edition the English description is yet more specific:

> *Upper side.*—The antennæ are brown, like fine threads. The colors on the anterior wings are divided by a strong bar of chocolate, running cross the wing near the middle, from the anterior to the posterior edges. This softens into a deep slate color, covering that part of the wings down to the external edges. The part next the shoulders is of a light ashen or pearl gray color whereon are two small black spots or stripes, situated near the anterior edge. On the dark part near the lower corner run two small black irregular lines from the posterior edge; one running cross the wing, the other only half across. The posterior wings are of a lightish brown, having two bars of deep brown (almost black) rising from the abdominal edge, and crossing the wing upward, grow broader and fainter as they approach the middle and anterior edge.
>
> Underside is of a faint russet color, having little or no markings thereon. All the wings are slightly dentated.

This figure and description could apply to nothing in our fauna save *obliqua* or the form with which I identify it here. It is too sharply marked for *obliqua*, and on the whole the description fits excellently well to the specimens now before me. It restores Drury's name without displacing any other now in use.

PHÆOCYMA BENESIGNATA (Harvey).

1875. *Homoptera benesignata* HARVEY, Bull. Buff. Soc. Nat. Sci., III, p. 14.

Ground color gray, washed and powdered with brown and black. Head and collar usually darker, ranging from red- to black-brown; collar with a black transverse line. Thorax more or less gray, with two brown or blackish transverse lines. Abdomen pale yellowish brown, the dorsal tuftings distinct. Primaries with basal space more or less brown; basal line geminate, usually black, always obvious. T. a. line black, sometimes shaded inwardly so as to resemble a band, with an acute outward tooth on the subcostal, and outcurve in the submedian interspace, and an abrupt inward bend below vein 1. Between the t. a. and median lines the median space is conspicuously pale ash-gray, forming the most characteristic feature of the wing. The median shade line is usually double, tending to form a band, the inner portion black, sometimes almost upright, more often a little out-bent on the median, a little incurved in the interspace below it, and a little out-bent below vein 1, so that the gray band is broadest on the inner margin. Beyond this median shade the median space shades off gradually to the t. p. line, which is slender, black, complete, and preceded by gray powderings; opposite the cell it is deeply indented and moderately incurved from vein 4; usually a little marked on all the veins. There is no obvious orbicular in any specimen before me. Reniform narrow, lunate, blackish, outwardly followed by a yellowish brown cloud. S. t. line incurved from costa to vein 4, where it forms an acute outward tooth, then with another incurve to the inner margin, well within anal angle. Usually the line is black or blackish, a little diffuse inwardly, but sometimes it tends to become lost or obscure toward the costa. The s. t. space is mottled with gray and brown, but hardly contrasting. Beyond the s. t. line the terminal area is gray strigillate with brown, with a brown terminal line and brown cuts on the fringes. Secondaries paler, whitish-gray to yellowish-fuscous, the disk crossed by two or three diffuse darker lines which may unite into a dusky fascia; beyond the middle a complete brown line, followed at a little distance by a more distinct black one which is usually lost before it reaches the inner margin. The space between these two lines more or less darkened. Beyond the outer black line is a pale edging which sometimes forms a distinct whitish line. The terminal area is sometimes a little lighter, strigillate, and tends to a brown terminal line. Beneath pale, more or less yellowish, powdery-gray; margaries with median, t. p. and s. t. lines and a discal lunule more or less obvious; secondaries with extramedian and s. t. lines and a discal lunule.

Expands, 1.40–1.60 inches = 35–40 mm.

Habitat.—Webster, New Hampshire, in May; Indian River, Florida.

Only two males and two females of this very distinct and handsome species are at present before me. I know of a few others in collections and they are as a rule correctly determined. There is little variation represented other than that incidentally mentioned in the description, and there is no apparent difference between the sexes.

The spinulation of the middle tibia is distinct in both sexes, and in one of the females there are two distinct spines between the two pairs of spurs. The middle femora of the male are conspicuously thickened, and the fringing of long hair incloses a large mass of specialized scales.

In the male the genitalia are very like the others of this series, offering only differences in detail rather than in type, and best shown by a comparison of the figures.

In the female the depressions of the upper surface of the terminal segment are well marked and the lobes of the under side are well marked and decidedly asymmetrical. The right lobe is much the smaller and the opening to the copulatory pouch is from the upper inner angle, but all from the upper margin, so that it is well to the right of the middle.

All things considered, this is one of the most brilliant of our species and I strongly suspect that when more material is available, it will be found that Mr. Morrison's name *cinerea* will be found applicable.

PHÆOCYMA LARGERA, new species.

Bluish ash-gray over a pale chocolate-brown base. Head brown. Collar with a darker brown line medially and at tip, edged with gray scales. Thorax with alternate gray and brown lines. Abdominal tuftings small. Primaries as a whole gray, all the markings more or less well defined in brown or blackish, not contrasting. Basal line brown, broad, inwardly diffuse. T. a. line single, brown, diffuse; irregular, as a whole inwardly oblique. Median shade very distinct, inwardly bordered by a darker brown or blackish line which is almost upright in effect, feebly bisinuate in course, outwardly shading off to the ground just before the t. p. line inferiorly, and at the reniform in the cell. The reniform is a very distinct, narrow, blackish lunule, which may be preceded by pale scales and is followed by a rusty yellowish shading. Orbicular a small black dot. T. p. line single, brown, diffuse, irregular, outwardly curved over the cell, moderately indented opposite the reniform, deeply incurved below the cell. S. t. line a brown diffuse shading, inwardly in whole or part edged with blackish scales, forming obvious outward teeth on veins 3 and 4, a lunule between them, with a slight incurve to the margins; that toward inner margin being most marked. There is a narrow brown

terminal line, and a series of brown interspaceal marks before the fringes. Secondaries smoky or fuscous, paler at base, with obscure discal line and a double brown or blackish exterior line. There is a gray, powdery marking toward anal angle, an irregular terminal line, and a series of gray lunules. Beneath yellowish, with a smoky discal lunule and two outer lines on all wings.

Expands, 1.80 inches=45 mm.

Habitat.—Winnipeg, Manitoba; Vancouver Island, May 8, G. W. Taylor.

Types.—Rutgers College collection and collection Barnes.

One male and 1 female; the former from Doctor Fletcher, the Vancouver example; the latter from Doctor Barnes, the Winnipeg example. The male lacked an abdomen when it reached me, but was otherwise in good condition.

The two examples are very much alike, the male a little darker as a whole, the female with a little more of the rusty yellow shading from the reniform. These are not sexual differences and they probably occur in both males and females.

The species is larger and much less contrastingly colored than *benesignata*, yet resembles that species in the definition of the median shade. It is also larger than *duplicata*, much grayer, and with the transverse markings more diffuse. It is not likely to be confused with any other of the species and is, indeed, one of the most distinct of the series.

The spinulation of the median tibia is moderately distinct in both sexes and easily seen. In the male the middle femora are not conspicuously tufted, and the mass of specialized scales is not great.

The indentations on the upper surface of the anal segment of the female are well marked; on the under surface the lobes are markedly asymmetrical, that on the right being decidedly smaller than the left and more ovate. The opening to the copulatory pouch is from the middle of the upper surface of the right lobe.

PHŒOCYMA DUPLICATA (Bethune).

1856. *Homoptera duplicata* BETHUNE, Canadian Journal, X, p. 267.

Ground color fuscous to smoky brown, the males darker throughout and more obscurely marked. Collar usually with a ferruginous tinge, a black line across the middle. Thorax crossed by two black and gray bands. Abdomen dark, the terminal segments ochreous, dorsal tuftings distinct. Primaries with all the markings distinct in most females and many males. Basal space darker; basal line black, single. T. a. line black, single, inwardly brown margined, sharply produced on the subcostal, a little outcurved below the cell and inwardly oblique below vein 1. The median line is usually well marked, nearly upright, brown, double, tending to form an obscure

fascia, the space between it and t. a. line more or less gray powdered in the female and usually a little paler in the male. There is an orbicular dot in some examples, while in others it is entirely absent. Reniform lunate, smoky, outwardly edged with pale scales and tending to become outlined in pale; a reddish or gray shade to the t. p. line which is narrow, linear, black or brown, and tends to become lost in whole or in part. Opposite the cell it has the usual indentation forming a W, with the outer angles more or less rounded. S. t. line black, tending to become diffuse inwardly, sharply toothed on vein 4 and thence forming the usual inward curves toward costal and internal margins respectively. There is a more or less obvious dusky shade beyond the lower half of this line in some specimens, which obscures the otherwise paler terminal area, which is strigillate with brown. There is a distinct brown crenulated terminal line in most females and in some the fringes are narrowly cut with brown. In the male there is an obvious white blotch above the anal angle, forming a conspicuous feature of the wing. Secondaries more sordid fuscous or yellowish-brown with obscure median shade lines, an outer black line inwardly bordered by a brown shade, which forms a more or less distinct band and may be inwardly margined by a more or less distinct brown line; outwardly this black line is bordered by pale scales, and there are gray powderings in the terminal area tending to form strigillations. There is a brown terminal line, the incisions tending to become marked by white scales. Beneath much paler, yellowish brown, powdery; all wings with a more or less obvious discal lunule; usually there is an extra-median transverse darker line, and sometimes a median line as well.

Expands, 1.40–1.60 inches = 35–40 mm.

Habitat.—Maine; New York; Pennsylvania; New Hampshire (Webster and Manchester).

I have 5 males and 6 females under examination, none of them dated and most of them with the State label only. No two examples are alike. All the males have the conspicuous white spot above the anal angle and none of the females have any trace of it; but as for the rest, the terminal space varies equally in both sexes in the amount of gray or distinctness of strigillation. The conspicuous terminal line of most females is characteristic, and is an aid in referring occasional examples that have a smoother vestiture than usual. In the male the tendency is to almost absolute uniformity in color from base to s. t. line, and one of the examples comes close to reaching this point. The median band is not well defined in any example of this sex, while in all save one of the females it is very distinct.

The tendency is toward *benesignata* in the female, and occasionally a specimen of this sex may cause trouble in placing; but this is on the whole so distinctly a powdery form that this must happen but rarely, while in the male no confusion is possible.

The spinulation of the middle tibia is not strongly marked, and in the male not easily demonstrated in the thick vestiture. The sexual tufting on the middle femora of male is not conspicuous and the mass of specialized scales is small.

The genitalia of the male are of the general type in the group, and while they differ in detail from the related species, offer nothing conspicuously peculiar.

In the female the impressions on the upper surface of the anal segments are very well marked, and the lobes of the under side are equally obvious. They are less asymmetrical than usual and the opening to the copulatory pouch is at the upper inner angle, coming from the upper margin rather than the angle.

PHÆOCYMA BETHUNEI, new species.

Ground color dull smoky brown, with a more or less well defined rufous tinge, which is conspicuous in all cases on the primaries, between the reniform and t. p. line. Head concolorous. Collar with a black line at base, a smoky line across the middle, and a blackish line at tip; each line may be edged with white scales and, on the other hand, all the lines may be lost or barely indicated. Two gray lines cross the thorax, and these may be quite distinct or barely traceable, while in flown examples they may appear to be altogether absent. Abdomen dull brown, terminal segments often ocherous; dorsal tuftings very distinct. Primaries with the vestiture a little uplifted so that the wing has a sort of velvety appearance, on which all the markings appear somewhat diffuse and none are sharply limited or contrasting. Basal space usually darker and apparently crossed by transverse dusky shadings. Basal line traceable in most specimens. T. a. line darker brown or blackish, single, irregularly outcurved, with a little outward tooth on the subcostal and a more obtuse bend on the submedian. The median shade is upright and may consist of a solid broad band of smoky brown or blackish, or of two parallel diffuse lines close together, broadening a little on the cell so as to include the narrow lunate reniform which is rarely separate from the band. Before this median band there may be a gray powdering, and between it and the t. p. line there is usually a decided reddish tinge which, as already noted, becomes most conspicuous just beyond the reniform and, in fact, gives the impression of a large, kidney-shaped, discolorous reniform. T. p. line brown to blackish, single, outwardly toothed on veins 4 and 6, with a deep inward indentation between and strongly incurved below the cell. S. t. line tending to become lost through the upper part of its course, and always better marked below middle; forms the usual obtuse outward angulation at its middle, and incurved from that point toward costa and inner margin. There is a more or less obvious dentate terminal line at base of the paler fringes. Secondaries

smoky, a little paler than primaries, with two diffuse transverse smoky lines just within middle, and a more or less obviously double extra-median line, the space between which may be darkened to form a band. A smoky terminal line following the irregularities of the wing margin, and lunate whitish spots marking the indentations. Beneath much paler, more yellowish-brown, with t. a., t. p., and s. t. lines and a discal spot more or less obvious on all wings; the space between the outer lines sometimes a little darker so as to form a band.

Expands, 1.25–1.50 inches=31–38 mm.

Habitat.—Washington, District of Columbia, June and August; Tryon, North Carolina, August, Fiske collection; Maine.

Types.—U.S.N.M., Coll. No. 12027; also Rutgers College collection.

Two males and 6 females. The specimens from District of Columbia and North Carolina are from the U. S. National Museum, and one male bears a label "Larva found feeding on Pine, Imago iss. June 19, 82."

There is very little difference between the sexes in the material under examination; but there is a little gray powdering beyond the s. t. line which may become more marked at times. As for the rest, it is merely a matter of more or less obscurity in maculation.

The spinulation of the middle tibia is scant and not readily demonstrated in the heavy vestiture. In the male, the femoral tufting is not prominent and the mass of specialized scales is not large.

The genitalia of the male do not differ in any material point from those of *duplicata.*

In the female the impressions on the upper surface of the anal segments are obvious, and tend to become discolored. On the lower surface the lobes are distinctly asymmetrical and are relatively small, compared with the size of the opening to the copulatory pouch. The latter is at the upper inner angle of the right lobe, and entirely on the upper margin.

As a whole this is a well marked form, differing from all others by its elevated rough vestiture and absence of all sharply defined maculation.

PHÆOCYMA CINGULIFERA (Walker).

1852. *Phœocyma lunifera*‡ GUENÉE, Spec. Gen., Noct., III, p. 3, pl. XV, fig. 9.
1857. *Homoptera cingulifera* WALKER, C. B. Mus., Het., XIII, p. 1056.
1857. *Homoptera intenta* WALKER, C. B. Mus., Het., XIII, p. 1070.
1877. *Homoptera woodii* GROTE, Can. Ent., IX, p. 88.
1893. *Homoptera cingulifera* (=*intenta*) SMITH, Bull. 44, U. S. Nat. Mus., p. 370.
1893. *Homoptera cingulifera* (=*woodii*) SMITH, Bull. 44, U. S. Nat. Mus., p. 370.
1903. *Homoptera cingulifera* HOLLAND, Moth Book, p. 278, pl. XXXVII, fig. 17.

Ground color smoky brown. Head uniform rusty brown. Collar only a little darker, with a median transverse black line and a white

tip. Thorax crossed by dark and gray transverse lines, the posterior tuftings uplifted and gray-tipped. Dorsal tuftings of abdomen small, sometimes gray-tipped. Primaries transversely strigillate, the strigillation continuous, brown, and many of them completely crossing wing. Basal space darker than the rest of the wing. Basal line brown, geminate, usually obvious. T. a. line a broad, rather even, deep brown band, preceded by a yellowish line, almost direct from costa to middle, then bent inwardly oblique to inner margin. The median space as it begins at the t. a. line is gray, and is the palest portion of the wing, relieving the dark t. a. line; outwardly it shades into the ground, sometimes before the middle, sometimes hardly before the t. p. line. The orbicular is a small brown dot, which is sometimes lost. Reniform gray, lunate, with a rusty brown annulus within its area, and poorly defined by a darker border. T. p. line narrow, linear, rich velvety brown, irregular, outwardly bent from costa to vein 7, then inwardly bent opposite the reniform and then, with three sinuations, obliquely inward to the internal margin. From the apex a dark shade extends obliquely inward to the s. t. line opposite cell. S. t. line blackish brown, irregular, rather close to and as a whole parallel with t. p. line; inwardly diffuse, outwardly bordered by rusty brown. Terminal area usually only a little darker than the inner portion of median space, darkened by the brown strigæ, with a narrow, crenulate terminal line. Secondaries smoky-yellowish at base, and usually to an extra-median brown shade, which is like the paler ground of primaries. The disk is crossed by dusky transverse shadings, and the terminal area is strigillate. Beneath yellowish, powdery, more or less strigillate with brown, sometimes gray along costa and outer margin; a dusky discal lunule and a median and extra-median dusky line on all wings; the latter with an outward angle below costa of primaries.

Expands, 1.52–1.92 inches=38–48 mm.

Habitat.—Maine to Florida, west to Wisconsin.

In the material before me there is a very dark richly colored example from Mount Katahdin, Maine, dated in July. Specimens from Webster, New Hampshire, are dated in May, and some very handsome material from New Brighton, Pennsylvania, was collected by Mr. H. D. Merrick in late April.

This is one of the most characteristic species of the genus, and while it varies somewhat in brilliancy of coloring and amount of contrast, there is never enough to raise a doubt as to the species. The peculiar elevation of the posterior thoracic tufting and its contrasting color are distinctive features belonging to none other of these species except *Zale horrida*.

The spinulation of the middle tibia is distinct in both sexes, and in some examples spines occur also between the two pairs of spurs

of the posterior tibiæ. The middle femora of the male have no sexual tufting nor store of specialized scales.

The male genitalia are symmetrical or nearly so, but the penis sheath is bent and curved to a moderate extent.

The depressions on the upper side of the penultimate segment are well defined and marked by discolored scales. The lobes on the under side are almost equal in size and approximately so in form. The opening to the copulatory pouch is at the upper inner angle of the right lobe, almost central as to the segment, and comes from the inner margin entirely.

There seems to be no doubt that Guenée's figure in the Species General refers to this species and not to the true *lunifera* of Hübner, and the latter's figure lends itself very easily to this misidentification. It is equally certain that Hübner did not have this particular species before him in his work.

PHÆOCYMA COLORADO, new species.

Ground color dull fuscous, more or less washed with gray or brown. Head lighter or darker than ground, with or without a dark frontal line, sometimes with a gray line as well. Collar with a distinct black line inferiorly, and a broader, brown band near tip. Thorax with two more or less obvious transverse lines, which may or may not be edged with white scales posteriorly. Abdomen with the dorsal tuftings conspicuous. Primaries with the wings conspicuously strigillate, the basal and s. t. spaces always darker than the other portions. Basal line geminate, black, usually well marked. T. a. line geminate, often in the form of a broad, brown, even band, preceded by a narrow pale line, only a little irregular outwardly. Beyond this line there is in the male always, and in the female sometimes, a whitish or very pale area merging gradually into the darker outer portion of the median space. There is no orbicular in any of my specimens. Reniform small or moderate, lunate, uniformly dark brown or blackish, yet not conspicuous and without defining lines. T. p. line narrow, single, black or brown, always complete, with the usual inward tooth on the cell moderate, and the line otherwise only a little irregular. S. t. line slender, black, nearly parallel with the t. p. line from inner margin to middle, where it forms an obtuse angle and diverges outwardly so as to reach the costa well within the apex. The s. t. space is dark throughout, but above the angulation it tends to become paler than elsewhere, and it darkens again on the costa, forming a conspicuously darker, roughly triangular patch. Terminal area more or less gray in the male and sometimes in the female; usually with an oblong dark apical patch. There is a black, crenulated terminal line, exaggerating the lines of the outer margin, with a white dot at the incisions and a tendency to a dusky line across the fringes

at the extensions. A whitish line at the base of the fringes, which are interlined with brown. Secondaries with the disk crossed by three obscure dusky lines, the intervals between which may be gray powdered. The outer black line extends from anal margin to apex with a slight incurve, usually a little indented on the veins and outcurved between, preceded by a darker shading which becomes most obvious at anal angle, followed by a paler shading which, in the male, tends to occupy most of the terminal area. There is a distinct, black, thread-like terminal line, with more or less marked white dots at the incisions, and there is a pale line at the base of the fringes. Beneath smoky, with more or less obvious gray shadings and powderings; sometimes almost immaculate, more often with only discal spots; often with an exterior common line and rarely, on secondaries, two or three darker lines across the disk.

Expands, 1.40–1.80 inches=35–45 mm.

Habitat.—Colorado, May and June, Manitoba, Denver, Glenwood Springs; Arizona in June, Palmerlee and Williams; Texas in March; probably all collected by Belfrage.

Types.—U.S.N.M., Coll. No. 12028; Rutgers College Collection; cotypes, Coll. Barnes, Ottolengui, Brooklyn Institute.

A series of 23 males and 9 females is at hand for comparison and shows a considerable range of variation. The large females from Texas resemble *cingulifera* so closely at first sight that I was not surprised to find specimens so placed in collections. The uniformly dusky reniform of this species, however, separates it at a glance. Some of the males at first seem referable to *rubiata*, and there is one form, occurring in both sexes, in which the median space becomes yellowish brown and a resemblance to *minerea* is established. The tendency is for the females to become uniformly dull brown, without obvious gray shadings, but with the basal and subterminal spaces conspicuously dark. In all cases the transverse strigillation is distinct or even conspicuous, but it is least marked in the specimens with yellow brown median space.

The spinulation of the middle tibia is sparse, but the spines are long and are easily distinguishable in the vestiture. There are no conspicuous femoral tuftings in the male and on the middle legs there is no mass of specialized scales.

The genitalia of the male are only a little asymmetrical, both harpes very strongly down-curved and a little enlarged near the tip, having the general type of *rubi* and *rubiata*, but differing in detail as shown in the figures; it does not resemble *cingulifera* at all.

In the female the genitalia are asymmetrical. The depressions on the upper surface of the penultimate segment are distinct, but not marked by discolorous scales. On the under side the lobes are altogether different in outline. The one to the right is not more than half

the size of that on the left, obliquely oval in form, with the opening to the copulatory pouch taking up most of the upper margin.

The species is probably not at all uncommon.

PHÆOCYMA RUBIATA, new species.

Ground color a grayish, luteous brown, dull and sordid. Head concolorous. Collar with a blackish line inferiorily. Thorax without markings. Abdomen with the tuftings small, especially in the female. Primaries very little powdery, very flat in tint. Basal space a little darker, especially in the male. Basal line geminate, brown, traceable in most specimens. T. a. line geminate, forming a broad brown band which is outwardly edged with black, and inwardly defined by a narrow yellowish line; in course very even, forming no obvious dents or angulations. There is no obvious orbicular. In the males the median space usually becomes a little more reddish-brown outwardly, but in all the females at hand it remains uniform. The reniform is of moderate size, lunate or kidney shape, usually a little darker, more or less obviously defined by an edging of darker scales and by a pale outer line which may extend all around the macula. T. p. line very slender, usually blackish, but sometimes only a little darker than the ground; a very moderate indentation opposite the cell and in most specimens a slight though well-marked angle on vein 2. In the males the s. t. space is usually darker than the other spaces; in the females it is concolorous. S. t. line black, usually the most distinct feature of the wing, inwardly diffuse, followed by a variably evident pale line which, in some specimens, tends to interrupt the line on the veins and give it a somewhat lunate appearance. In course the line is parallel with the t. p., and equidistant from it from the internal margin to vein 7, whence it extends outwardly oblique to the costa. An oblique brown to blackish shade extends from the edge of the s. t. line on vein 7 to the apex. Terminal space in the female concolorous throughout; in the male it contrasts a little against the darker s. t. space and there is a tendency to a gray powdering beyond the s. t. line, especially below the middle. There is a brown terminal line, preceded by a series of black points in the interspaces, and there is a pale line at base of fringes. Secondaries with two or three obscure brown shade lines across the disk, followed by a geminate outer line, which represents the continuation of the t. p. and s. t. lines of primaries; the intervening space more or less distinctly brown-filled in both sexes. The outer of these lines is the most distinct, and there is usually an obvious outward dent in the interspace beyond the cell, forming a small W. The terminal lines and dots are as in the primaries. Beneath yellowish, more or less powdery, ranging from im-

maculate to forms with a discal spot and two irregular transverse lines on all wings.

Expands, 1.32–1.52 inches = 33–38 mm.

Habitat.—Arizona; January, May, August.

Types.—Coll. U.S.N.M., Coll. No. 12029; also cotypes Coll. Rutgers College and Doctor Ottolengui.

Only 2 of the 18 examples before me have specific localities—Phoenix and Nogales—but several of them are dated. There are 13 males to 5 females, and the difference between the sexes is conspicuous. The females are all very even, but by no means alike, since the ground varies in shade and no two are alike in the relative distinctness of the lines, especially of the s. t. line. In the males the chance for variation is greater, because the median space darkens or deepens in tint outwardly, and because there is a tendency to lighten up the terminal area in greater or less contrast to the s. t. space.

Whether this species is really distinct from *rubi* is perhaps a question. It seems so to me at present, judging from the scanty material of *rubi* now in my hands. As the species stand now, *rubiata* is always of some shade of dull yellow-brown and has a peculiar dead flat tint. *Rubi*, on the contrary, is gray, and has no obvious red or yellow shadings at all. The differences may be racial or geographic, or they may prove merely individual when better material is at hand.

The spinulation of the middle tibia is sparse and often difficult to make out in the vestiture. The middle femora of the male have no obvious tuftings, and there is no mass of specialized scales.

The male genitalia are not markedly asymmetrical; the harpes differ a little in width and outline, but are similar in length and curvature. Compared with those of *rubi* they are distinctly broader and stouter.

In the female there is not much evidence of modification on the upper surface of the penultimate segment. Beneath, the lobes are similar in size and form, with the opening to the copulatory pouch from the upper inner angle, and mostly from the inner margin. There is very little difference in detail between *rubi* and *rubiata*, and such as there is can be better determined by a comparison of the figures.

PHLOCYMA RUBI (Henry Edwards).

1881. *Homoptera rubi* HENRY EDWARDS, Papilio, I, p. 28.

Gray, tending to smoky. Head concolorous; collar with a black median line; thorax in the specimens before me without markings. Primaries very uniform in tint, without strong contrasts except that the s. t. line is distinctly black. Basal space a little darker to the band-like t. a. line, which consists of geminate, very narrow blackish lines, with the intervals dusky filled. It is preceded by a pale line

and on the median vein and costa are some dark scales indicating a geminate basal line. Median space concolorous or crossed by vague, transverse dusky shadings. Orbicular wanting in the specimens. Reniform rather long, kidney-shaped, almost lunate, edged with yellow scales. T. p. line very slender, black, outwardly exserted over the cell to vein 4, then with a decided incurve obliquely to the inner margin; a little drawn in opposite the reniform. S. t. line black, distinct, inwardly oblique from costa to the indrawing of t. p. line opposite reniform, then close to and parallel with that line for the balance of its course. The outward angle is well marked between veins 3 and 4, and a dusky shade may extend from that point to the margin. There may be an oblique, dusky apical shade. There is a very narrow, crenulated terminal line, followed by an equally narrow pale line at the base of fringes, a very minute dusky dot marking the indentations of these lines on the interspaces. Secondaries basally a little paler, disk crossed by obscure transverse dusky shadings. Beyond this the usual double line, of which the inner is black and thread-like, continuing the t. p. line of primaries, and the outer better marked, broader, inwardly diffuse, outwardly bordered by a pale shade line; this combination tends to terminate at apex rather than on the costa. Terminal lines as on the primaries. Beneath yellowish gray, powdery, all wings with a discal spot and an extra-median line; that on the secondaries more or less crenulate.

Expands, 1.48–1.60 inches = 37–40 mm.

Habitat.—Soda Springs, Siskiyou County, May 31; Yosemite Valley; both in California.

I have only one male and one female, the former from the Dyar collection in the U. S. National Museum, taken by Mr. J. B. Lembert, the latter given me by Mr. Henry Edwards, and almost a duplicate of his type. The Arizona localities given refer, I think, to the species that I have called *rubiata*, and whose relations I have already discussed. In addition to what has been previously said it may be pointed out that the angle of s. t. line in *rubi* is decidedly more acute and produced, and does not tend to form an obtuse curve involving the interspaces between the 4th and 5th, as well as 3d and 4th veins.

As for the structure of legs and genitalia, they are as described for *rubiata*, with such differences as are best brought out by a comparison of the figures given.

PHÆOCYMA YAVAPAI, new species.

Ground color very dark brown, powdered with black, so that at first sight the insects appear almost black. Head powdered with gray; a more or less obvious gray and black frontal line, and a similar line on the vertex. Collar gray tipped, with a distinct black median transverse line in all specimens. Primaries with basal space a little

darker. Basal line distinct, black, more or less obviously geminate. T. a. line forming a broad deep brown band, outwardly edged by a black line, and inwardly by pale scales. Median space scantily powdered with white scales, usually more massed toward t. a. line; three broad, diffuse, smoky transverse lines beyond the middle. The reniform is somewhat lunate, elongate, inwardly edged with black scales, outwardly with a more or less complete white line. Orbicular a black dot or entirely absent. T. p. line very slender, black, even, rather evenly outcurved over the cell, and oblique, only a little wavy, below it. S. t. line a little broader, equally distinct, forming an acute outward angle on vein 5, reinforced by a lunate black mark between veins 7 and 8, and from this a blackish shade extends to the apex. The space between t. p and s. t. lines is usually darker, and there is a darker brown shade beyond the s. t. line, divided from it by an edging of white scales. Terminal space strigillate with black; a pale terminal line. Fringes interlined black and white. Secondaries lighter brown, the disk crossed by three broad, brown lines, alternated with narrow whitish lines. A geminate extramedian line, of which the intermediate space is dark filled, forming a broad band edged with narrow black lines, of which the outer is the more distinct and followed by a narrow white line. A white terminal line, and fringes with white interline. Beneath very dark fawn gray, somewhat mottled with brown, with a common extramedian line and dark discal spots. The costa is marked and spotted alternately blackish and gray, there is a narrow black terminal line, followed by a whitish line at the base of the fringes, and there is a white dot at the incisions between the veins.

Expands, 1.32–1.52 inches = 33–38 mm.

Habitat.—Yavapai County, Arizona, July 22–August 5; Glenwood Springs, Colorado, in May.

Types.—Rutgers College Collection: cotypes, Coll. U.S.N.M., No. 12080, and Doctor Barnes.

One male and 3 females collected by Mr. Hutson; 2 males and 1 female from Doctor Barnes. This species is quite different from its nearest allies in a number of ways. There is very little variation in the material before me and very little difference between the sexes. The male has perhaps a little more white powdering, but otherwise the two are alike.

In type of maculation it is like *edusina*, so like that it is difficult to find points of distinction between the two, and with the San Antonio males of the other species at hand for comparison, it seems but a short step from one to the other. The only really tangible and constant character in *yavapai* besides the very dark color is the clean-cut black line on collar, which is not present in any *edusina* that I have seen. Nevertheless, the two species are markedly distinct, for while in *edusina* the femoral tufting of the male is conspicuous and

the mass of specialized scales is large, in *yavapai* the tufting is reduced to a mere fringe of long hair, and there are no specialized scales at all. I have only 3 males of *yavapai*, but all these had the legs perfect, so that I could verify the point; of *edusina* I have a large series of males, and even the darkest of them which most resemble the new form have the femoral mass of scales conspicuous.

In male genitalic characters *yavapai* differs only in details from *edusina;* the differences are obvious enough on comparison, but not so marked as might be anticipated from the difference in the secondary characters; the type is identical.

In the female the differences from *edusina* are greater. There is a series of chitinous plates surrounding the genital opening; but the plates are much larger, very characteristic in form, and utterly unlike those found in *edusina.* A comparison of the figures will make this matter very clear at first glance, and that these differences are constant I have verified by an examination of two preparations of *yavapai* and of several *edusina.*

PHÆOCYMA CALYCANTHATA (Smith and Abbot).

1797. *Phalæna calycanthata* SMITH AND ABBOT, Ins. Ga., II, p. 207, pl. CIV.
1816. *Phœocyma calycanthata* HÜBNER, Verzeichniss, p. 275.
1852. *Homoptera calycanthata* GUENÉE, Sp. Gen., Noct., III, p. 15.
1875. *Homoptera uniformis* MORRISON, Can. Ent., VII, p. 148.

Ranges in ground color from dirty yellow- to light chocolate-brown, more or less powdered and strigillate with darker brown. Head concolorous; collar with an obscure darker line; thorax with vague dusky transverse shadings. Abdominal tuftings small, and in well preserved examples white-tipped. Primaries with basal space usually a little darker; t. a. line indicated chiefly by the difference in shade between the two spaces. T. p. line lost. S. t. line yellow or pale, continuous or broken, sometimes preceded and sometimes followed by a dark shading or an edging of black scales, in direction oblique from costa to inner margin, almost rectangularly exserted on vein 4; the angle sometimes well marked, sometimes rounded. Orbicular punctiform, black, distinct in all my specimens. Reniform moderate, not well defined, upright, dusky or blackish, more or less edged or marked with paler scales. The terminal area is usually paler than the rest of the wing, but may be concolorous or even darker. A crenulated terminal line in some examples, with a series of black points at the inward teeth. Secondaries may be lighter or darker than or concolorous with primaries, with a variably distinct outer line that continues the s. t. of primaries and is very much like it in its make-up and variation. As a rule it does not reach the costal margin and sometimes falls well short of it; but it may be yellow and preceded by a dark shade, well defined all the way across. Terminal area usually a little paler. Beneath yellowish to fuscous,

powdery or strigillate, usually with a dark discal lunule, sometimes with more or less obvious transverse lines or shades.

Expands, 1.28–1.48 inches; 32–37 mm.

Habitat.—North Carolina; Georgia; Florida.

Three males and four females are now under observation, and I have not seen many more in collections. The only dated example is from "Vade Mecum, N. C., VII, 3." No two specimens are alike, and yet there is no doubt of their association. The comparatively small size, broad primaries, conspicuous s. t. and absent t. p. lines, and the dark, ill-defined reniform all unite to form an absolutely unique combination.

The species has been curiously misidentified in American collections, at least three if not four distinct species doing duty under the name, and never have I seen the species here described among them. The species indeed seems rare. Abbot refers to this fact in his description, but says it is more common in Virginia; but what he had from Virginia may be questioned. Guenée had only Abbot's figures, and his description fits one of my examples very nicely. He criticises Abbot's engraving and says it is badly rendered; but I have examples that suit that engraving very well indeed. Morrison had the species from Georgia, but did not recognize its identity with Abbot's form, and redescribed it as *uniformis*. It is probable, indeed, that he never even compared it with the figure. Doctor Bethune identified *Zale horrida* with this name, and that is no worse than the other identifications, some examples of *calycanthata* resembling reduced brown *horrida*.

The spinulation of the middle tibiæ is distinct in both sexes, and in some cases there may be spines on the posterior tibiæ between the usual spurs. The middle femora of the male are not tufted and have no store of specialized scales.

The male genitalia are markedly asymmetrical, the harpes bearing no resemblance to each other; the figures must be referred to for details.

The females have the terminal segment on the upper side without obvious impressions, and the underside is not lobed. There is a large anal orifice surrounded by irregular chitinous pieces, and inside of this, to the left, is the opening to the copulatory pouch.

PHÆOCYMA HORRIDA (Hübner).

1818. *Zale horrida* HÜBNER, Zutræge, I, p. 11, figs. 31, 32.
1818. *Zale horrida* HÜBNER, Verzeichniss, p. 275.
1852. *Zale horrida* GUENÉE, Spec. Gen., Noct., III, p. 281.
1857. *Homoptera calycanthata* ‡ WALKER, C. B. Mus., Het., XIII, p. 1054.
1858. *Drasteria horrida* WALKER, C. B. Mus., Het., XIV, p. 1457.
1866. *Homoptera calycanthata* ‡ BETHUNE, Canadian Journal, X, p. 251.
1868. *Homoptera horrida* (= *calycanthata* WALKER, not GUENÉE) GROTE and ROBINSON, Trans. Am. Ent. Soc., II, p. 79.

Ground color varying from light chocolate brown to almost blackish. The patagia and posterior thoracic tufts discolorous yellowish

brown behind. Primaries of the ground color to the s. t. line, beyond which it is a much lighter brown, ranging almost to whitish, with fine transverse brown strigillations. The t. p. and s. t. lines are coincident from vein 7 to the inner margin, with an outward lobe at middle and a deep incurve below. Above vein 7 the t. p. line separates and goes obliquely inward to the costa in the form of a double pale line. The t. a. line is rather irregular and not very well marked; but is traceable in the paler specimens and is black, preceded by a yellowish mark on costa. The basal line is also indicated by a yellowish costal line, which sometimes extends across the costal area. The disk is crossed by three more or less obvious dusky shade lines. Secondaries a little paler than the primaries to the terminal area, which is separated off by a denticulated pale line, the paler terminal area with brown strigillations. The disk is crossed by three or four somewhat darker shade bands. Beneath smoky, crossed by numerous wavy shade bands.

Expands, 1.40–1.60 inches = 35–40 mm.

Habitat.—Canada to Texas, west to the Rocky Mountains, May to August in the northern part of its range, Texas in March and August.

This is a very characteristic species which does not vary to any considerable extent, nor enough to confuse its identity at any time.

The genitalia of the males have the harpes similar in size but quite dissimilar in form; both are rather narrow and bent downward; but the left harpe is continuous, flattened toward the tip and squarely cut off, while the right is extended at the angulation into a flattened process like a short fork.

The female has the penultimate segment lobed, the lobes subequal, the opening to the copulatory pouch at the upper inner angle of the right lobe, and all from the side of the lobe, no part of the top being involved.

HOMOPTERA CINEREA Morrison.

1875. *Homoptera cinerea* MORRISON, Can. Ent., VII, p. 148.

The following is Morrison's original description:

Expanse, 45 mm. Length of body, 20 mm.

Palpi gray, of normal form. Collar, thorax, and abdomen cinereous black. Pterygodes well marked. Abdomen strongly tufted, the two anal segments ochreous, very distinctly so beneath. Both wings shining, cinereous, on a black ground; the outer half of the wings have a slight purple tinge in certain lights; orbicular spot a black dot; median shade well marked, angulate on the median vein, followed by a blackish, less cinereous shade line, twice angulate opposite the brown diffuse reniform spot; subterminal line distinct inferiorly only a yellow brown shade along the costa of the posteror wings; the disk of the wings is occupied by alternating cinereous and blackish shades, the former predominating; one distinct black median line preceded by a blackish shade. Beneath uniform cinereous, gray, discal dots not prominent.

Hab. Massachusetts.

The beautiful cinereous and black coloration of this fine species will at once separate it.

I have not been able to apply this description satisfactorily, but suspect that it refers to *benesignata* Harvey. There is no other that has the same contrasting gray and black maculation; but, on the other hand, I could not call the primaries "Shining, cinereous, on a black ground." I am compelled, therefore, much to my regret, to leave this name without definite application.

Among the material sent me by Doctor Dyar for examination was a single example from the Schaus collection, labeled Miami, Florida, and without much doubt actually taken there. It was associated in the collection with South American examples marked *Homoptera sexplagiata* Walker, and is apparently the same species.

This form is utterly unlike any other of our American species and is tropical in type. It is an example of that element that extends into our political boundaries at certain points, but is not a part of the faunal region to which all but a very small area of North America north of the Mexican boundary line naturally belongs.

Had the species fitted naturally into any of the groups of our species I would have included and called attention to it there. As it does not, I present a copy of Walker's original description:[a]

HOMOPTERA SEXPLAGIATA.

Mas. *Cervina, subtus cinerea; thorax e punctis albis subfasciatus; pectus fuscum; abdomen cinereum; alæ lineis plurimis transversis undulatis nigris; anticæ fascia incompleta basali, lituris costalibus plagisque duabus magnis submarginalibus subviridiscentibus albis; posticæ basi testaceæ, fascia abbreviata subfusiformi submarginali alba.*

Male.—Fawn colour, cinereous beneath. Thorax with some white specklea, which form incomplete bands. Pectus brown. Abdomen cinereous. Wings with numerous transverse undulating black lines. Fore wings with an incomplete white band near the base, with white marks along the costa, and with two large submarginal white indistinctly iridescent patches, forming a broad interrupted band. Hind wings with a subfusiform submarginal band like that of the fore wing in colour, shortened in front; base testaceous. Length of the body 7¼ lines; of the wings 20 lines.

a. Brazil. From Mr. Stevens' collection.

LIST OF THE SPECIES OF PHEMOCYMA Hübner.

SUBGENUS PHEMOCYMA *vera*.	SUBGENUS PHEMOCYMA *vera*—Cont'd.
P. ephesia Guenée.	*P. edusina* Harvey.
P. fictilis Guenée.	*airitinota* Harvey.
guadulpensis Guenée.	*P. undularis* Drury.
P. viridans Guenée.	*nigricosta* Bethune.
P. lunata Drury.	var. *umbripennis* Grote.
edusa Drury.	*P. æruginosa* Guenée.
putrescens Guerin.	*plenipennis* Walker.
impolata Walker.	*P. insuda* Smith.
saundersii Bethune.	*P. norda* Smith.
P. salicis Bahr.	*P. mineres* Guenée.
rosea Behr.	*obliqua* ‡ Walker.
	albofasciata Bethune.

[a] Catalogue of Heterocera, etc., XIII, 1857, p. 1064.

SUBGENUS PHÆOCYMA *vera*—Cont'd.

P. lunifera Hübner.
penna Morrison.
P. lineosa Walker.
lunifera ‡ Grote.
galbanata Morrison.
P. unilineata Grote.
P. obliqua Guenée.
P. metata Smith.
P. curema Smith.
P. helata Smith.
P. squammularis Drury.
P. benesignata Harvey.
P. largera Smith.
P. duplicata Bethune.
P. bethunei Smith.

SUBGENUS ZALE Hübner.

P. cingulifera Walker.
intenta Walker.
woodii Grote.
lunifera ‡ Guenée.
P. colorado Smith.
P. rubiata Smith.
P. rubi Henry Edwards.
P. yavapai Smith.
P. calycanthata Smith and Abbot.
uniformis Morrison.
P. horrida Hübner.
calycanthata ‡ Walker.

Unknown to me.

P. cinerea Morrison.

EXPLANATION OF PLATES.

PLATE XXXI.

Fig. 1. *Phœocyma exhausta*, dorsal view of male genitalia. Shows the flattened extension shielding the uncus.

2. *Phœocyma fictilis*, male genitalia from side so as to show the form of the uncus. The harpes are not greatly dissimilar.

3. *Phœocyma lunata*, male genitalia from above; brings out more particularly the double process of right harpe.

3*a*. *Phœocyma lunata*, same from below, showing the curved penis sheath and the left harpe with its irregular tip.

3*b*. *Phœocyma lunata*, the right harpe seen from below, showing the relation of the two divisions to each other.

3*c*. *Phœocyma lunata*, the left harpe seen from below.

3*d*. *Phœocyma lunata*, frame of supra-anal plate with uncus.

3*e*. *Phœocyma lunata*, the penis sheath from below.

4. *Phœocyma salicis*, male genitalia from above.

5. *Phœocyma edusina*, male genitalia from above; the left harpe is divided into two parts.

5*a*. *Phœocyma edusina*, male genitalia from side, to bring out the form of the very long transversely flattened uncus.

6. *Phœocyma undularis*, male genitalia from above.

7. *Phœocyma umbripennis*, male genitalia from above; this is the same as *undularis*, but the two figures are slightly different to bring out the peculiar form of the harpes. The supra-anal plate is really extraordinarily narrow and the uncus very slender.

8. *Phœocyma æruginosa*, male genitalia from above.

PLATE XXXII.

Fig. 1. *Phœocyma insuda*, male genitalia from above; harpes and uncus forced a little to the right to bring out the form better.

2. *Phœocyma narda*, male genitalia from above.

‡ Species cited in error.

Fig. 3. *Phœocyma minerea*, male genitalia from above. Very like the preceding, the differences in the figures being in part due to a little difference in point of view.
4. *Phœocyma lunifera*, male genitalia from above.
5. *Phœocyma lineosa*, male genitalia from above. Directly comparable with the preceding, both views being a little from the right to bring out form better.
6. *Phœocyma unilineata*, male genitalia from above; almost symmetrical.
7. *Phœocyma obliqua*, male genitalia from above.
8. *Phœocyma metata*, male genitalia from above.
9. *Phœocyma curema*, male genitalia from above.
10. *Phœocyma helata*, male genitalia from above.
11. *Phœocyma squammularis*, male genitalia from above.
12. *Phœocyma benesignata*, male genitalia from above.
13. *Phœocyma duplicata*, male genitalia from above.

PLATE XXXIII.

Fig. 1. *Phœocyma bethunci*, male genitalia from above; somewhat distorted by pressure.
2. *Phœocyma cingulifera*, male genitalia from above; almost symmetrical.
3. *Phœocyma colorado*, male genitalia, obliquely from above and right side.
4. *Phœocyma rubiata*, male genitalia from above and a little to the right.
5. *Phœocyma rubi*, male genitalia from above and a little to the right; directly comparable with the preceding.
6. *Phœocyma yavapai*, male genitalia from above; should be compared with the similar structure in *edusina*.
7. *Phœocyma calycanthata*, male genitalia from above and a little to the right.
8. *Phœocyma exhausta*, terminal segments of female abdomen from beneath.
9. *Phœocyma fictilis*, terminal segments of female abdomen from beneath.
10. *Phœocyma lunata*, terminal segments of female abdomen from beneath; the bursa copulatrix is shown at the right, connected with the ringed opening.
11. *Phœocyma salicis*, terminal segments of female abdomen from beneath.
12. *Phœocyma edusina*, terminal segment of female abdomen from beneath; showing opening to copulatory pouch at left side of plate.

PLATE XXXIV.

Fig. 1. *Phœocyma undularis*, terminal segments of female abdomen from beneath, with opening to bursa copulatrix at the upper angle of right plate. On the other figures the opening is indicated in a similar way and approximately it is near the upper junction of the two plates but always from the right plate.
2. *Phœocyma umbripennis*, same as the preceding and shows about the extent of the variation found within specific limits.
3. *Phœocyma æruginosa*, terminal segments of female abdomen from beneath.
4. *Phœocyma insuda*, terminal segments of female abdomen from beneath.
5. *Phœocyma norda*, terminal segments of female abdomen from beneath.
6. *Phœocyma minerea*, terminal segments of female abdomen from beneath; practically like the preceding.
7. *Phœocyma lunifera*, terminal segments of female abdomen from beneath.

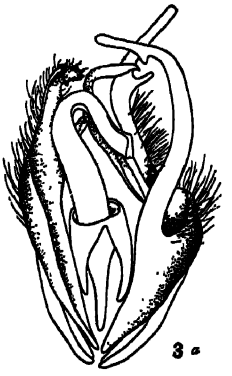
Fig. 8. *Phaecyma lineosa*, terminal segments of female abdomen from beneath; practically like the preceding.
9. *Phaecyma antilineata*, terminal segments of female abdomen from beneath.
10. *Phaecyma obliqua*, terminal segments of female abdomen from beneath.
11. *Phaecyma metata*, terminal segments of female abdomen from beneath; note the difference in the location of the opening to the bursa copulatrix as compared with the preceding and next following species.
12. *Phaecyma curema*, terminal segments of female abdomen from beneath.

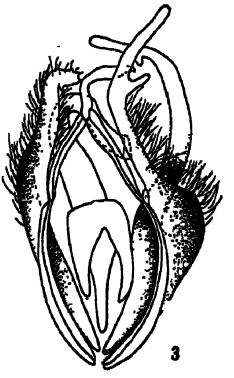
PLATE XXXV.

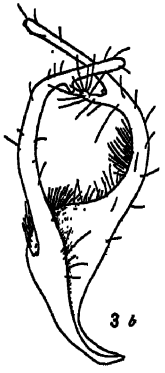
Fig. 1. *Phaecyma helata*, terminal segments of female abdomen from beneath.
2. *Phaecyma aquamicularis*, terminal segments of female abdomen from beneath.
3. *Phaecyma bonesignata*, terminal segments of female abdomen from beneath.
4. *Phaecyma largera*, terminal segments of female abdomen from beneath.
5. *Phaecyma duplicata*, terminal segments of female abdomen from beneath.
6. *Phaecyma bethunei*, terminal segments of female abdomen from beneath.
7. *Phaecyma cingulifera*, terminal segments of female abdomen from beneath.
8. *Phaecyma colorado*, terminal segments of female abdomen from beneath.
9. *Phaecyma rubiata*, terminal segments of female abdomen from beneath.
10. *Phaecyma rubi*, terminal segments of female abdomen from beneath.
11. *Phaecyma yavapai*, terminal segments of female abdomen from beneath. In this and the following the segment is broken into fragments and the opening to the copulatory pouch is not well marked.
12. *Phaecyma calycanthata*, terminal segments of female abdomen from beneath.

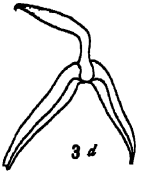
PLATE XXXVI.

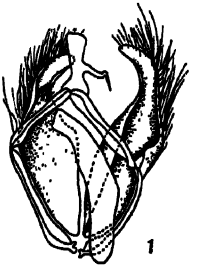
Fig. 1. *Phaecyma lunata*, leg of male from the inner side showing the mass of specialized hair and scales in place.
2. Same, with the specialized mass removed and only the fringe of hair in place.
3. Varieties of scales and hair found in the mass; the broad scales are striated and form the outer covering to the mass.
4. A bundle of hair or rod-like scales forming the great bulk of the fluffy mass when teased out.

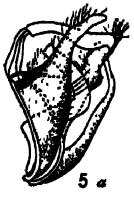


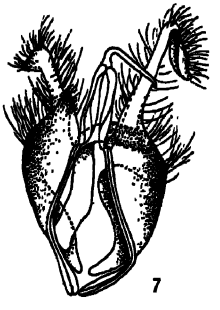


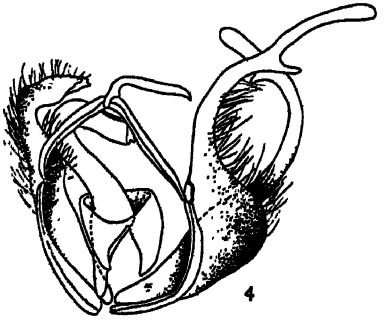


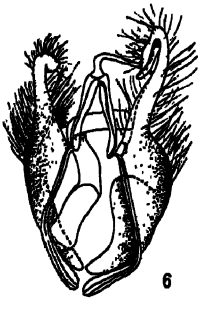


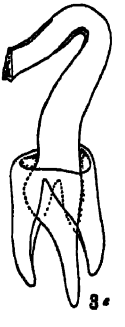






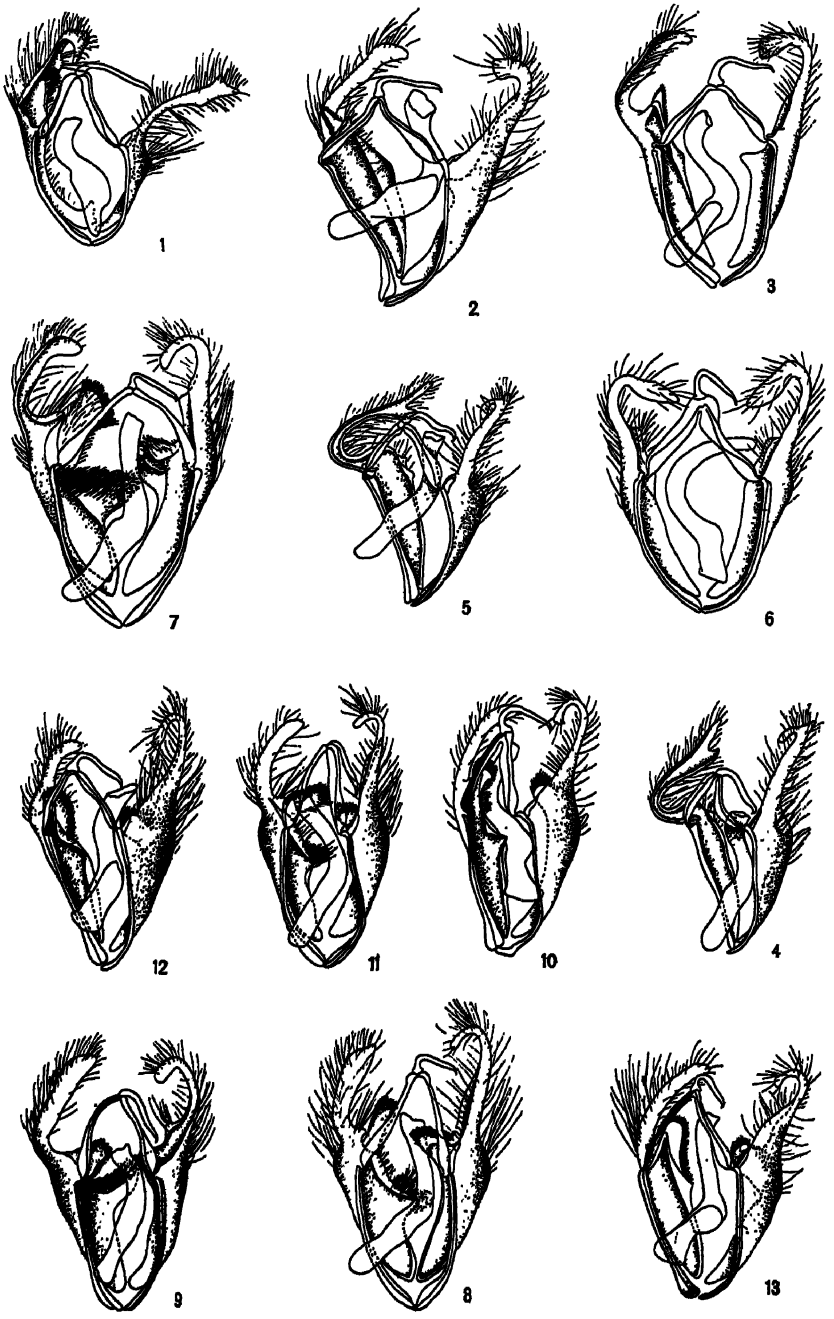






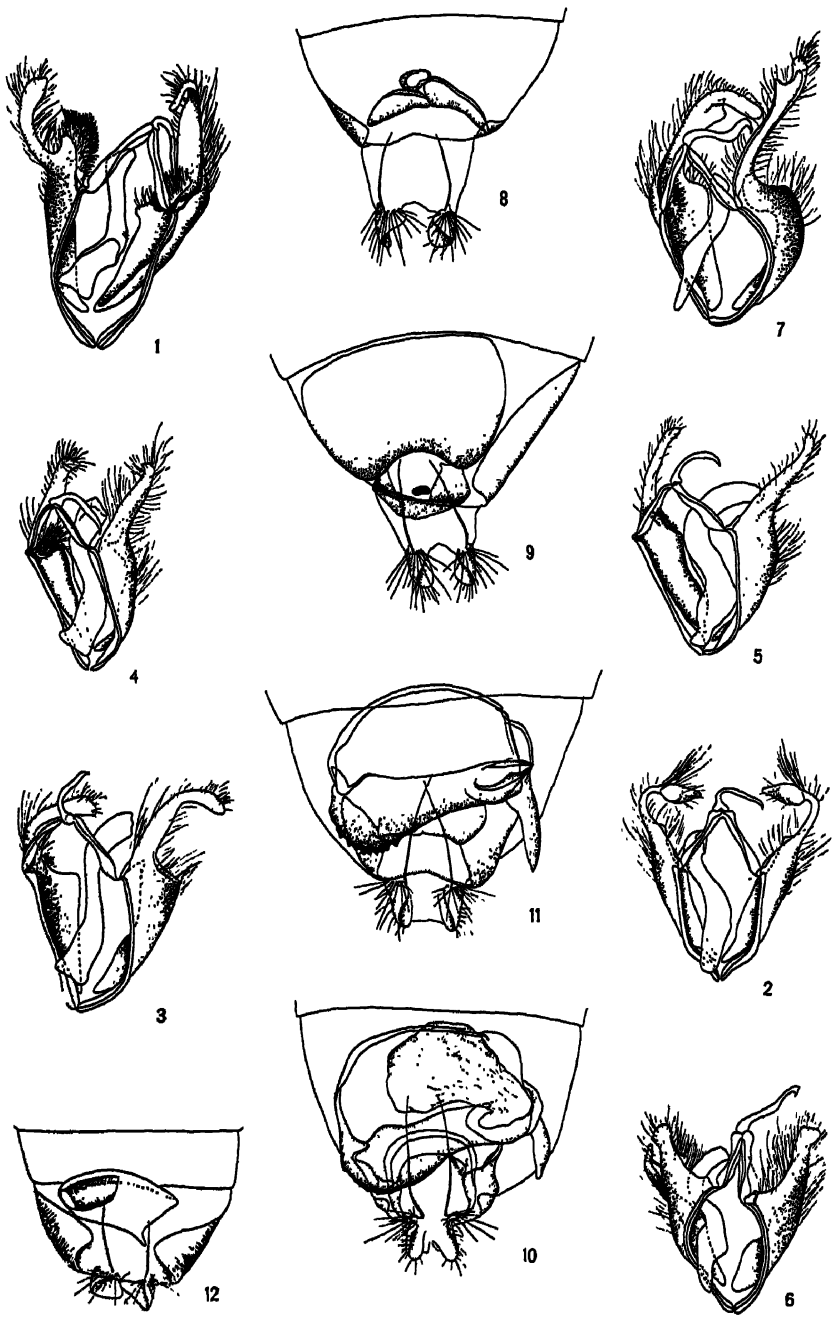
MALE GENITALIA OF PHÆOCYMA.

FOR EXPLANATION OF PLATE SEE PAGE 273.



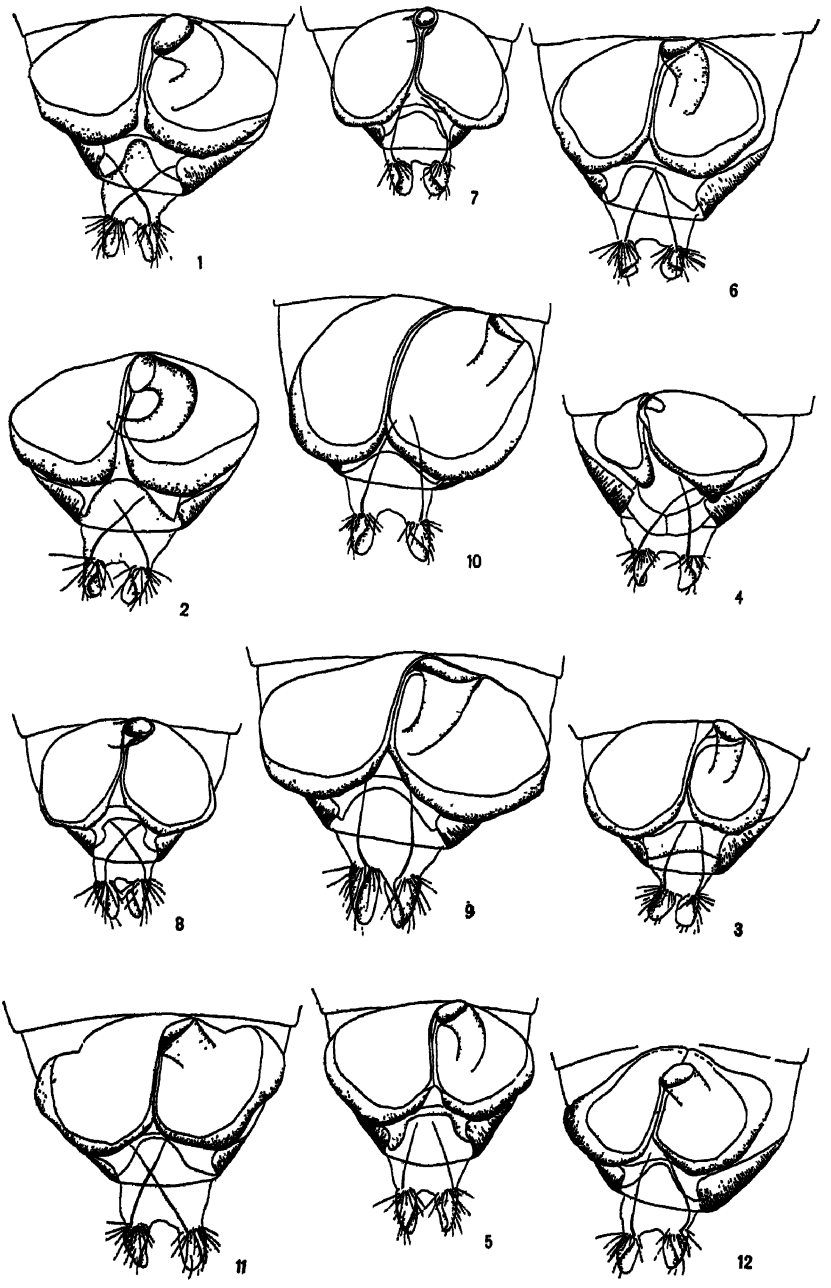
MALE GENITALIA OF PHÆOCYMA.

FOR EXPLANATION OF PLATE SEE PAGES 273, 274.



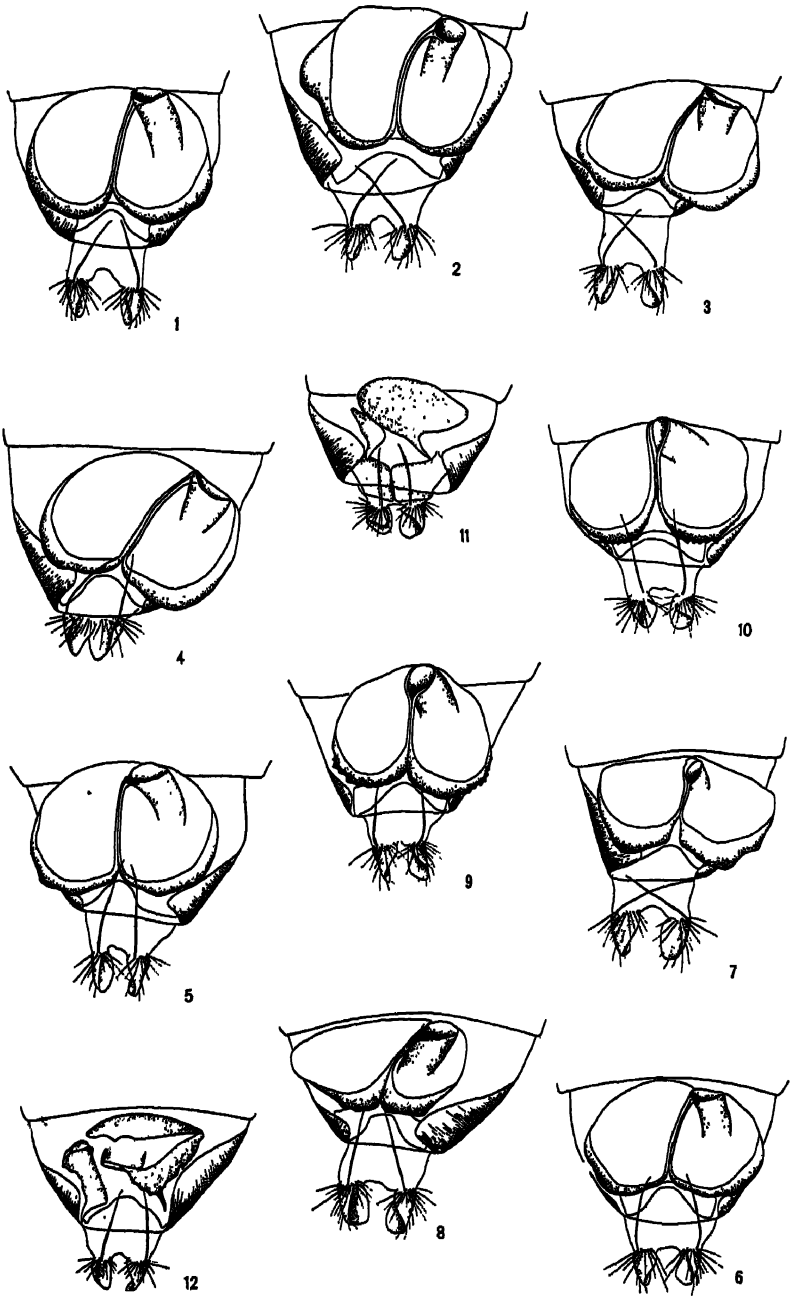
MALE AND FEMALE GENITALIA OF PHÆOCYMA.

FOR EXPLANATION OF PLATE SEE PAGE 274.



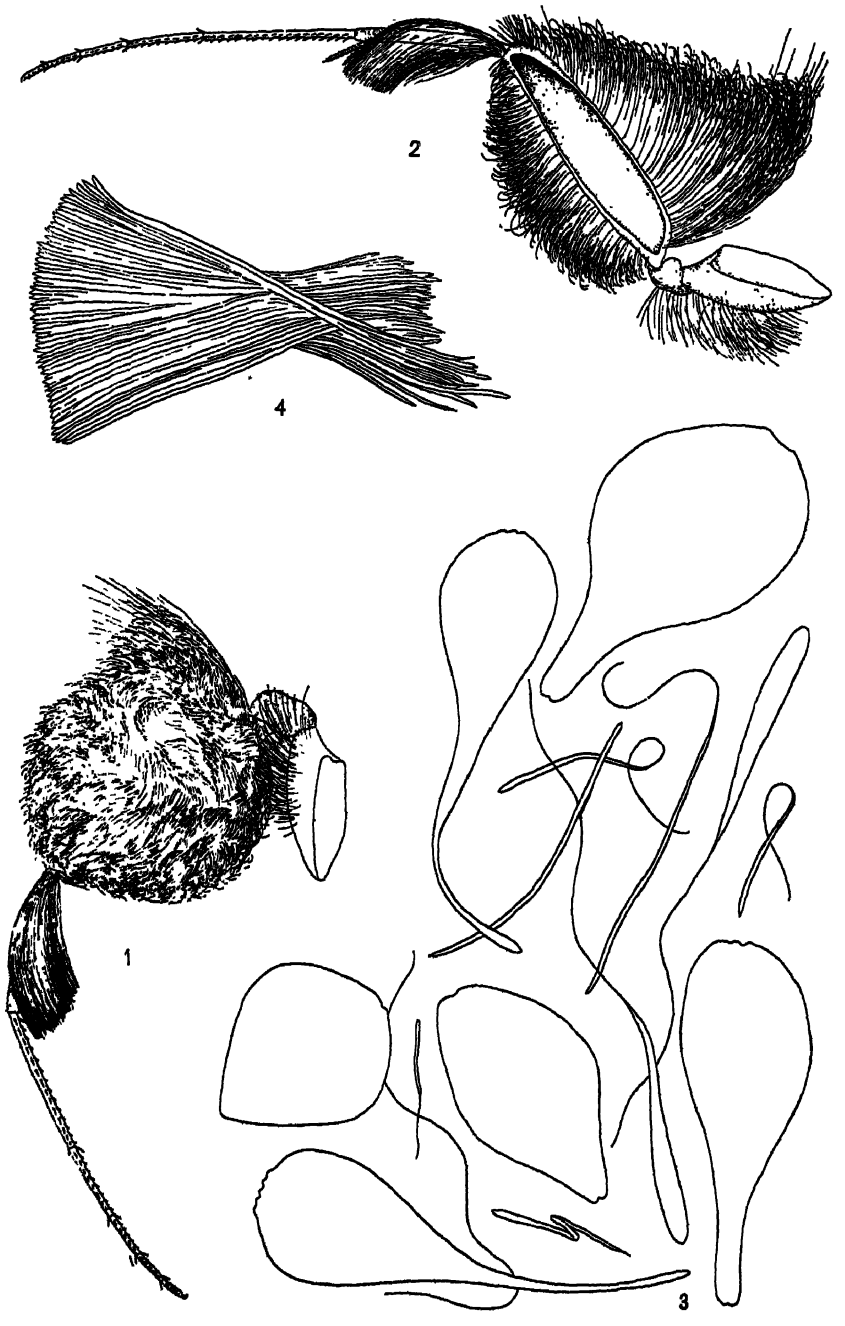
FEMALE GENITALIA OF PHÆOCYMA.

FOR EXPLANATION OF PLATE SEE PAGES 274, 275.



FEMALE GENITALIA OF PHÆOCYMA.

FOR EXPLANATION OF PLATE SEE PAGE 275.



STRUCTURAL DETAILS OF LEG OF PHÆOCYMA LUNATA.

FOR EXPLANATION OF PLATE SEE PAGE 275.

NEW SAWFLIES IN THE COLLECTIONS OF THE UNITED STATES NATIONAL MUSEUM

BY

S. A. ROHWER

Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

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NEW SAWFLIES IN THE COLLECTIONS OF THE UNITED STATES NATIONAL MUSEUM.

By S. A. Rohwer,

Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

It is believed that the following species are congeneric with the genotypes as defined in the two papers by the author dealing with the subject of genotypes.[1] In the making of descriptions a Carl Zeiss binocular and Carl Zeiss hand lens were used. The figures are from camera lucida sketches. The following new species do not exhaust the collections of the United States National Museum, and some other papers dealing with genera not treated in this paper will be submitted later. While some of the descriptions are apparently brief, they will, it is believed, suffice to determine the species in question with certainty. Certain new species in this paper have been described by comparison with an old species. If the reader has a species, differing from the old species in characters not mentioned in the comparison between the old and new species, it may be considered different from the new species. To redescribe characters common to many species is of no value in a description.

This paper is a contribution from the Division of Forest Insects of the Bureau of Entomology of the United States Department of Agriculture.

Genus ACANTHOLYDA Costa.

ACANTHOLYDA (ACANTHOLYDA) PINI, new species.

Related to *atripes* (Cresson), but may be distinguished by the paler legs, the black and pale abdomen, and non-yellowish wings.

Female.—Length 13 mm. Head with rather large, separate punctures; lateral supraclypeal area smooth, shining impunctate; clypeus shining, with widely separate punctures, the anterior margin not quite straight; antennæ 35-jointed, the apical joints small, third joint longer than four, but not as long as four plus five; middle fovea represented only by a line; no ocellar basin; all the furrows of the head wanting; the middle area of the mesonotum with dis-

[1] The Genotypes of the Sawflies and Woodwasps, or the Superfamily Tenthredinoidea, Bull. Tech. Ser. No. 20, pt. 2, U. S. Dep. Agr., Bur. Ent., pp. I-VI and 69-109, March 4, 1911.

Additions and corrections to "The Genotypes of the Sawflies and Woodwasps, or the Superfamily Tenthredinoidea," Ent. News, vol. 22, pp. 218-219, May, 1911.

tinct punctures; third cubital cell subequal with the second on the radius; transverse radius interstitial with second transverse cubitus; abdomen normal. Black, mandibles (apicies piceous), clypeus, posterior orbits, most of face below ocelli, three lines on vertex, tegulæ, line on pronotum, posterior part of anterior lobe scutellum, and lines connecting these two spots, most of episternum, venter, sides of dorsum, all the legs beneath yellowish. Wings dusky hyaline, venation pale brown.

District of Columbia. One female from beating on pine, April 26, 1903, collected by A. D. Hopkins.

Type.—Cat. No. 13983, U.S.N.M.

Genus DERECYTRA Smith.

DERECYTRA VARIIPENNIS, new species.

Perhaps more closely related to *D. pictipennis* than any other species, but it is not that species.

Male.—Length 14 mm. Anterior margin of the clypeus with a median tooth; mandibles short, robust, with large separate punctures; inner orbits striate; produced area of the front, depressed above medianly, shining, laterally irregularly striate; head behind the supraorbital line shining, impunctate; postocellar area nearly wanting not parted; fourth antennal joint longer than the third or fifth; middle lobe of mesonotum and lateral part of the lateral lobes transversely striate; anterior part of lateral lobes rather closely, distinctly punctured; scutellum rather coarsely, irregularly sculptured; mesoepisternum above striato-punctate, below and with the mesosternum punctate; second cubital cell much longer than the third; hypopygidium with the apical margin truncate, in the middle slightly emarginate. Rufo-piceous; antennæ black; posterior femora and apical dorsal segments darker. Wings brownish black, with a yellowish spot in the area surrounding the stigma.

San Bernardino, Paraguay. One male collected by K. Fiebrig.

Type.—Cat. No. 13984, U.S.N.M.

Genus HAPLOSTEGUS Konow.

HAPLOSTEGUS MEXICANUS, new species.

Black, except the mesonotum and scutellum which is rufous; wings brown, venation black.

Male.—Length 4 mm. Clypeus very small, apex truncate; a rather distinct transverse suture above the clypeus; antennal furrows distinct, continuous; middle fovea rather large, oval in outline, the sides sloping, extending laterally; anterior ocellus in an indistinct depression; postocellar furrow poorly defined; postocellar line but little longer than the ocelloccipital line; antennæ gradually

thickening apically, the first two joints subequal, the third longer than the fourth, the apical one longer than the preceding one, the apex pointed; scutellum obtusely pointed posteriorly; tarsal claws long and simple; hypopygidium with large punctures, the apex narrowed, obtusely rounded. Black, mesonotum and scutellum dark red; wings brown, venation black.

Cordoba, Mexico. One male collected on December 6, by F. Knab.

Type.—Cat. No. 13985, U.S.N.M.

CONOCOXA, new genus.

Rather small, robust species with a habitus very like *Acordulocera* Say; head nearly as wide as the thorax, rectangular when seen from above; eyes at the side of the head, large, their inner margins parallel; malar space present but narrow; antennæ inserted close to the clypeus, simple, seven-jointed, pedicel subequal in length with the scape, third joint much longer than fourth; clypeus small and not separated by a supraclypeal suture; labrum rather large; lateral ocelli slightly above the supraorbital line; thorax like *Acordulocera;* claws long simple; four anterior legs simple; posterior coxæ and femora much enlarged, especially in the male where they remind one of *Chalis;* in the male the posterior trochanters are armed with a spine; tibiæ without a superapical spur; venation differs from *Acordulocera* as follows: Costa uniform in thickness; first transverse cubitus only partly wanting; anal vein straight with a stump (A^2) projecting forward so that an incomplete petiolate anal cell is present; hind wings rather broader than in *Acordulocera;* third anal vein of hind wings present; abdomen similar to *Acordulocera.*

Genotype.—Conocoxa chalicipoda Rohwer.

CONOCOXA CHALICIPODA, new species.

Head and thorax black; abdomen partly ferruginous.

Female.—Length 4 mm. Clypeus obtusely rounded anteriorly; antennal fovea elongate; middle fovea deep, circular, small; anterior ocellus in a small diamond-shaped basin; antennal furrows complete; postocellar furrow present, well defined; postocellar line equal to the ocellorbital line; stigma very large, not twice as long as broad; sheath large, obtusely rounded at the apex. Black: abdomen except basal dorsal segments and apex of sheath ferruginous; legs ferruginous, base of coxæ, four anterior femora above, posterior tibiæ above and apical joints of tarsi black. Wings slightly dusky, hyaline; venation pale brown, stigma and costa pallid.

Male.—Length 5 mm. Middle fovea elongate; postocellar furrow and ocellar basin not as strong as in female; posterior coxæ tuberculate beneath; posterior trochanters with a long curved prong

extending backward; hind tarsi rather dilated toward the apex; hypopygidium broadly rounded at the apex; four anterior legs brown; apex of posterior coxæ, trochanters, femora except a black line above ferruginous, the rest of the posterior legs black. Except where mentioned the characters given for the female agree with the male.

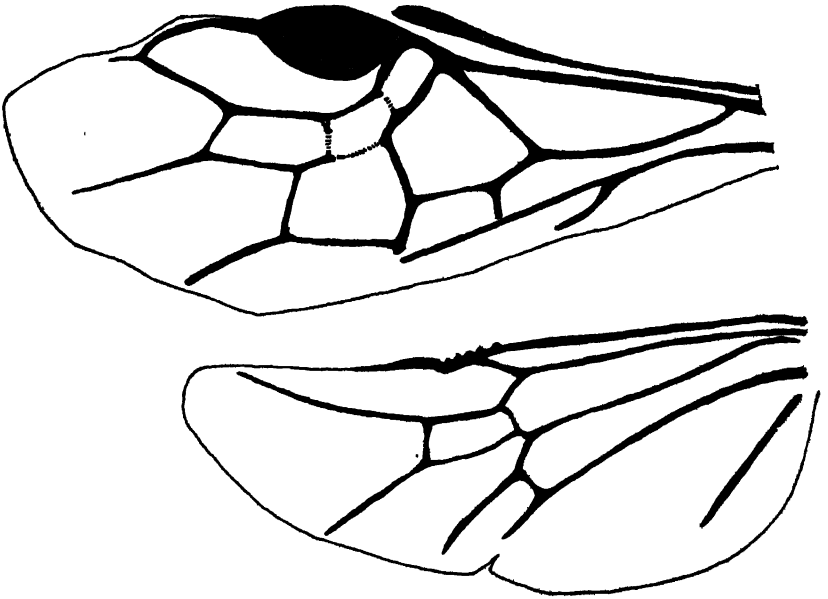

FIG. 1.—WINGS OF CONOCOXA CHALICIPODA ROHWER.

Chubut, Patagonia. A male and a female collected by W. F. H. Rosenberg.

Type.—Cat. No. 13986, U.S.N.M.

NITHULEA, new genus.

Very like *Conocoxa* Rohwer and agrees with the description of that genus except in the following points: Malar space broader; antennæ six-jointed, the third joint as long as the fourth and fifth combined, sixth subclavate; antennæ inserted nearly the width of the scape above the clypeus; caudad end of the scutellum rather sharply triangular; posterior coxæ elongate, but the femora normal, second transverse cubitus wanting; the cubital venation reminding one of *Euura* Newman.

Genotype.—*Nithulea nigrata* Rohwer.

NITHULEA NIGRATA, new species.

Entirely black; wings dusky hyaline, venation brown, stigma paller.

Female.—Length 3.5 mm. Clypeus broadly rounded on the anterior margin: antennal foveæ not sharply defined, striato-granular;

middle fovea wanting; a U-shaped depressed area in the middle of the face below the crest; antennal furrows complete, well defined; area around the anterior ocellus hardly depressed; postocellar furrow deep; postocellar line a very little shorter than the ocellorbital line; third antennal joint curved; head dulled, with fine scratches; stigma broad, rounded on the lower margin; sheath rather broad and robust. Entirely black; wings dusky hyaline; venation brown, stigma pale brown.

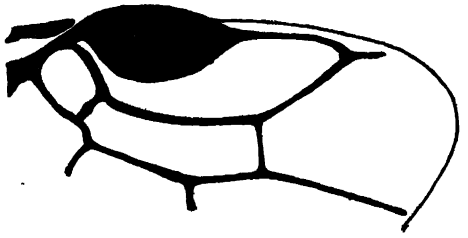

FIG. 2.—RADIAL VENATION OF NITHULEA NIGRATA ROHWER.

Chubut, Patagonia. One female collected by W. F. H. Rosenberg.

Type.—Cat. No. 13987, U.S.N.M.

Genus LOBOCERAS Kirby.

LOBOCERAS TRIMACULATUM, new species.

Apparently more closely related to some of the Brazilian species, *Loboceras trinotatus* Konow, etc., than any of the Central American forms, but does not agree with any of these. In color it is more like *Loboceras varicone* Cameron than the other described species from Central America.

Female.—Length 8.5 mm.; length of anterior wing 8 mm. Labrum nearly as long as wide, rounded at the apex; clypeus nearly truncate; ocellar basin open below and extending to the open middle fovea, making a broad, shallow facial fovea; antennal furrow not complete; posterior orbits not as broad as in *L. mexicanum* Kirby; postocellar area well defined, the lateral furrows not reaching the posterior margin of the head; third antennal joint distinctly longer than the fourth, but not as long as four plus five; scutellum margined laterally and not depressed in the apical middle; second cubital cell, much broader above than below, receiving the first recurrent slightly beyond the middle; second recurrent slightly beyond the second transverse cubitus; legs normal; sheath well concealed, truncate at the apex. Luteous; head, except pallid labrum, clypeus, supraclypeal area, scape, mandibles (apicies piceous), and antennæ black; a brownish spot on each lobe of mesonotum; intermediate tarsi and the posterior tibiæ and tarsi black. Wings yellowish hyaline, beyond the stigma dusky hyaline; venation to apex of stigma yellowish, in the dusky part of the wing brownish.

Piedros Negras, Costa Rica. One female collected by Schild and Burgdorf.

Type.—Cat. No. 13988, U.S.N.M.

Genus HEMIDIANEURA Kirby.

HEMIDIANEURA ALBOCOXA, new species.

Related to *H. tenebrica* Konow from Surinam, but has black tegulæ, partly pale clypeus, and the antennal furrows are not punctiform.

Female.—Length 8.5 mm. Labrum punctured, depressed in the apical middle; clypeus truncate; supraclypeal area convex; below the antennæ the head is punctured, above shining; antennal furrows extending to the vertex; middle fovea subcircular in outline, joining the ocellar basin; postocellar furrow distinctly present; lateral ocelli slightly anterior to the supraorbital line; pedecellum a little wider than long; flagellum rather slender; third cubital cell about twice as long on the radius as on the cubitus; second recurrent vein, interstitial with the second transverse cubitus; both in the fore and hind wings there is a spurious branch to the median extending nearly to the anal vein; stigma broadest at the base; sheath rather slender, straight above, sharply pointed, the lower margin oblique. Black: mesonotum except anterior part of middle lobe, scutellum, and a spot beneath wings red; most of clypeus, spot at base of costa, legs to basal third of tibiæ yellowish-white. Wings dark brownish-black; venation black.

Male.—Length 7 mm. Agrees with the female except for the sexual differences. Hypopygidium gently rounded apically, about twice as wide as long; gentalia stipes rather broad, gently rounded apically.

San Bernardino, Paraguay. Two males and seven females, numbered 2175*a* and 2175. Presented to the United States National Museum by K. Fiebrig.

Type.—Cat. No. 13989, U.S.N.M.

Genus ATOMACERA Say.

ATOMACERA DECEPTA, new species.

Related to *desmodii* Dyar, but the sheath is obtusely pointed at the apex, not obliquely truncate, and the scutellum is black. From *debilis* Say it differs in the poorly defined ocellar basin. *Ruficollis* Norton is very different in the sharply defined middle fovea.

Female.—Length 4.5 mm. Clypeus and labrum gently arcuately emarginate; supraclypeal foveæ distinct, punctiform; ocellar basin indistinct almost wanting, poorly defined above the ocellus; postocellar furrow wanting; postocellar line slightly shorter than the ocellorbital line; third cubital cell wider on the radius than on the cubitus, about three times as wide at apex as at base; sheath narrow, nearly parallel sided, at the apex obtusely pointed. Black; pronotum broadly, tegulæ and mesonotum except a large spot on anterior lobe rufo-testaceous; wings brownish, venation brown.

New York. One female.

Type.—Cat. No. 13990, U.S.N.M.

Genus CALOPTILIA Ashmead.

CALOPTILIA PICEOTERGA, new species.

Differs from C. *immunda* (Konow) in the black posterior tibiæ, and other characters.

Male.—Length 7 mm. Labrum depressed, the basal portion punctured; clypeus arcuately emarginate; middle carina strong; middle fovea elongate triangular, separated from the ocellar basin by a transverse ridge; ocellar basin pentagonal, not quite closed above; postocellar area poorly defined on all sides; impressed in the middle; antennæ rather slender, extending beyond the basal plates, curved apically; stigma rounded on the lower margin; third cubital cell longer than the apical width, and receiving the second recurrent near the base; hypopygidium about one third longer than wide, narrowing apically, obtusely rounded; gentalia stipes broader above apically. Black and obscure testaceous; head, antennæ, mesonotum, scutellum, apex of abdomen, anterior tarsi and the four posterior tibiæ and tarsi black; palpi meso and meta-pluræ, mesosternum, anterior coxæ and tibiæ, dorsal abdominal segments piceous; rest of the insect obscure testaceous; wings dusky hyaline; venation black.

Cordoba, Vera Cruz, Mexico. One male collected by F. Knab on January 29, 1908.

Type.—Cat. No. 13991, U.S.N.M.

CALOPTILIA NUBECULOSA ROSENBERGI, new variety.

Differs from *Caloptila nubeculosa* (Konow) as follows:

Ocellar basin pointed behind the median ocellus, not truncate; postocellar furrow absent, not present; mesonotum not marked with black; venation testaceous, not dark brown; wings mostly yellowish, not dusky; only apical dorsal segment black; face pale in the middle to level of antennæ. Female, length 8 mm.

Chawchamayo, Peru. One female from W. T. H. Rosenberg.

Type.—Cat. No. 13992, U.S.N.M.

Genus ACORDULECERA Say.

ACORDULECERA KNABI, new species.

In general color belongs to the group of black species with pale legs, but differs from the descriptions of all of these.

Female.—Length 3.5 mm. Antennal furrows nearly complete but not sharply defined; middle fovea transverse, shallow, rather large; a shallow depression above the middle fovea; ocellar basin rather small, bounded by low rounded walls; postocellar area wanting; third antennal joint nearly as long as four plus five; postocellar line nearly twice as long as the ocellocular line; stigma hardly twice as long as wide, rounded on the lower margin; sheath robust, broadly rounded apically; saw with cross rays, teeth small and rounded.

than the cephal-caudal length, poorly defined; head and thorax closely punctured; stigma but little more than twice as long as wide, a little broader at base, apex oblique; third cubital cell not much longer than broad; cerci hardly tapering; sheath broad, apex more or less rounded. Black: pro- and meso-thorax, legs, except extreme base of posterior coxæ, cerci, apical dorsal segment reddish, thorax darker; wings dusky hyaline, iridescent, venation pale brown.

Jacksonville, Florida. One female from the Ashmead collection.

Type.—Cat. No. 13993, U.S.N.M.

Genus PLATYCAMPUS Schiödte.

PLATYCAMPUS JUNIPERI, new species.

Readily separated from the other species by the black head. The Nearctic species have been referred previously to *Camponiscus* Newman.

Female.—Length 6 mm. Head broad, much broader than high; clypeus nearly truncate; antennal foveæ poorly defined; supraclypeal area convex; middle fovea shallow, triangular; ocellar basin almost wanting; postocellar area defined but not sharply so; postocellar line slightly longer than the ocellorbital line; antennæ strongly tapering, the third and fourth joints subequal; stigma broad, rounded on the lower margin, broadest at the base; third cubital cell but little wider at the apex; the second recurrent interstitial with the second transverse cubitus; upper and lower discal cell in the hind wings equal on the outer margin; claws stout, with an erect inner tooth; sheath broad, apex truncate, the lower margin oblique; cerci moderate. Reddish-yellow; head, antennæ, spots on the lateral lobes of mesonotum, metanotum, pectus, legs and sheath black; labrum, palpi and four anterior tibiæ and tarsi brownish. Wings hyaline, iridescent; venation dark brown, apex of stigma lighter.

Los Vegas, Hot Springs, New Mexico. Bred from *Juniperus*, adult emerging April 7, 1902.

Type.—Cat. No. 13994, U.S.N.M.

Genus PTERONIDEA Rohwer.

PTERONIDEA WINNANÆ, new species.

A distinct species falling nearer *P. dubius* (Marlatt) in Marlatt's Revision to North American Nematinæ, but is remarkably distinct from that species.

Male.—Length 5.5 mm. Clypeus distinctly angularly emarginate, lobes broad, rounded; antennal foveæ poorly defined; middle fovea narrow, elongate, open above; frontal crest slightly broken; ocellar basin well defined laterally, almost open below; postocellar area poorly defined; postocellar furrow wanting; postocellar line longer

than the ocellorbital line; antennæ strongly tapering, the third and fourth joints subequal; stigma rather elongate, rounded below, broadest near the base; third cubital cell very small, nearly quadrate; procidentia a little longer than wide, broadly rounded at the apex; hypopygidium narrow, elongate, apex obtusely pointed. Black: head, except a large spot from the crest to occipitut not reaching orbits, prothorax, tegulæ, upper part of mesoepisternum, metapleuræ, venter and legs, except the posterior tarsi, yellowish-white; antennæ all black. Wings hyaline, iridescent; venation dark brown.

Plummer's Island, Maryland, September 1, 1907. One male collected by A. D. Hopkins on *Salix*. Under the Bureau of Entomology number "Hopk.U.S.6495."

Type.—Cat. No. 13997, U.S.N.M.

Genus PACHYNEMATUS Konow.

PACHYNEMATUS ALASKENSIS, new species.

Pachynematus ocreatus KINCAID, Proc. Wash. Acad. Sci., vol. 2, 1900, p. 347.

Very like *P. ocreatus* (Harrington), but the frontal crest is broken; the postocellar area is not strongly convex, and is not wider at the occiput; the third cubital cell is fully one-third longer than the third transverse cubitus on the radius; and the tergum is marked with piceous.

Female.—Length 9 mm. Head expanding behind eyes; labrum broadly rounded apically, granular; clypeus broadly, arcuately emarginate, lobes rather pointed; supraclypeal area triangular in outline, somewhat convex; middle fovea large, triangular, open above where it breaks through the low crest; ocellar basin with the lateral walls rounded; postocellar area well defined on all sides, not strongly convex, not broading posteriorly; antennæ long, the third joint a little shorter than fourth; stigma large, angular at base, tapering to apex; abdomen as *ocreatus*. Reddish-yellow; antennæ, interocellar area, lateral lobes of mesonotum laterally, metanotum, and large spots on basal segments of tergum black or black piceous. Wings hyaline, iridescent; venation pale brown, stigma yellowish.

Sitka, Alaska. Three females collected April 16, by T. Kincaid while on the Harriman Expedition.

Type.—Cat. No. 13995, U.S.N.M.

PACHYNEMATUS PICEÆ, new species.

May be separated from *P. ocreatus* (Harrington), its near ally, by the small, deep, nearly circular middle fovea; in *ocreatus* the middle fovea is large and triangular.

Female.—Length 9 mm. Head expanded behind the eyes; labrum shining, depressed apically; clypeus subarcuately emarginate, lobes

broad, obtuse; supraclypeal area shining, convex, triangular in outline; middle fovea small, deep, circular, extending over the antennæ; crest very poorly defined, antennal furrows continuous; ocellar basin with the lateral walls rather sharp; postocellar furrow wanting; postocellar area rather strongly convex, the lateral furrows curved, broading posteriorly; antennæ slender, the third joint a little shorter than fourth; stigma broad, angulate near base, tapering to apex; third cubital cell not a third longer on the radius than the length of the third transverse cubitus; abdomen as in *ocreatus*. Reddish-yellow; antennæ, interocellar area, and on lateral lobes black or piceous; pronotum and tegulæ pallid; venation dark brown, stigma and costa yellowish.

The mesonotum in some specimens is all piceous.

Male.—What seems to be the male, as it bears the same label, shows remarkable antigeny. Length 7.5 mm. Head not strongly expanded behind the eyes; head as in female except the frontal crest which is broken, and the indistinctly present postocellar furrow; stigma not as angular as in female; procendia twice as long as wide, truncate; hypopygidium very long and narrowing apically where it is truncate; gentalia stipes large, long, exceeding the hypopygidium. Black; clypeus, mandibles (apices piceous), face beneath antennæ, posterior orbits narrowly below, tegulæ, angles of pronotum, and coxæ beneath pallid; legs below trochanters, except the posterior tibiæ and tarsi, abdomen except basal plates, apical dorsal segment, hypopygidium and gentalia reddish. Wings hyaline, iridescent; venation and stigma dark brown.

Grand Island, Michigan. Reared from larvæ collected on spruce, July 28, 1907, by A. D. Hopkins.

Type.—Cat. No. 13996, U.S.N.M.

SELANDRIDEA, new genus.

Belong to the Selandrinæ as defined by Doctor MacGillivray. In Konow's classification it runs to *Selandria*. From *Selandria* in the restricted sense it may be separated by the broad malar space, the eyes not or scarcely converging to the mandibles, the head being twice as broad as high, and the costa and subcosta being connected by chitin.

Genotype.—*Selandridea vanduzeei* Rohwer.

Selandria decorata Cresson should be placed here, and it may be that the European *Tenthredo flavescens* Klug will belong here.

Table of species.

Pleuræ largely pale; lateral ocelli in the supraorbital line..... *vanduzeei.*
Pleuræ black; lateral ocelli well behind the supraorbital line..... *decorata.*

SELANDRIDEA VANDUZEEI, new species.

Male.—Length 7 mm. Clypeus shallowly arcuately, emarginate, the lobes broad, rounded; supraclypeal foveæ deep, connected with the antennal foveæ; middle fovea large, subquadrate; ocellar basin large, well defined, triangular in outline; antennal furrows nearly complete; postocellar area well defined; the lateral ocelli on the supraorbital line; antennæ very robust, the third joint one-fourth longer than the fourth; the third cubital cell a little longer than the second; the transverse radius received in about the middle of the cell, the transverse median well beyond the middle; the lanceolate cell of the hind wings sessile; hypopygidium shallowly emarginate apically. Reddish-brown; flagellum, head (except the clypeus, labrum and mandibles), mesonotum, metanotum, mesopectus, and bases of the hind coxæ black; wings hyaline, iridescent, slightly yellowish; the costa and stigma black, venation testaceous.

Female.—Length 7.5 mm. Differs from the above description of the male in the parted postocellar area, and the lower part of the mesopleuræ being black. Sheath slender, straight above, apex broadly rounded.

Buffalo, New York. A male and female collected by M. C. Van Duzee, for whom the species is named, June 4, 1910. Also four males from Canada without definite data.

Type.—Cat. No. 13998, U.S.N.M.

Genus NESOSELANDRIA Rohwer.

NESOSELANDRIA RUFONOTA, new species.

Apparently related to *Selandria crassa* Cameron and *Selandria ruficollis* Norton, but does not agree with the descriptions of either of these.

Male.—Length 5 mm. Supraclypeal foveæ wanting; antennal foveæ hardly defined; supraclypeal area subconvex; middle fovea very poorly defined, transverse, walls rounded; lateral foveæ small, punctiform; postocellar area hardly defined, lateral furrows punctiform; postocellar line subequal with the ocelloccipital and ocellocular lines; stigma short, about two and one-half times as long as greatest width, subangulate below; transverse radius a little beyond the middle of cell; hypopygidium long, narrow, broadly rounded apically. Black; clypeus, labrum, legs (except the infuscate posterior tibiæ and tarsi) brownish-white; pronotum, tegulæ, first perapteron and mesoscutum rufous. Wings uniformly brownish; venation black.

Acapulco, Mexico. One male collected July 29, by F. Knab.

Type.—Cat. No. 13999, U.S.N.M.

Genus ANEUGMENUS Hartig.

ANEUGMENUS FLAVIPES FLAVIPES (Norton.).

This subspecies occurs from Canada to Georgia and west to Michigan. The wings vary from hyaline to the basal portion being strongly infuscate.

ANEUGMENUS FLAVIPES OCCIDENTALIS, new subspecies.

Female.—Differs from the typical form in the poorly defined ocellar basin, the lateral walls being present above, but the lower wall is wanting. The antennæ are somewhat shorter. Wings hyaline.

Colorado. One female.

Type.—Cat. No. 13939, U.S.N.M.

ANEUGMENUS FLAVITARSIS, new species.

This and the following new species may be separated from *flavipes* (Norton) by the lateral walls of the ocellar basin being subparallel, touching the inner margins of the ocelli, the basin being open above. (In *flavipes* the basin is triangular, the lateral walls meeting above and between the ocelli.)

Female.—Length 5.5 mm. Antennal foveæ and supraclypeal foveæ confluent, the latter hardly defined; supraclypeal area convex; lateral foveæ a little above the level of the middle fovea, subcircular in outline; middle fovea transverse, curved, well defined; postocellar line subequal with the ocellocular; postocellar area convex, sharply bounded laterally; flagellum wanting; stigma broadly rounded. Black shining; labrum, posterior angles of pronotum, tegulæ, and legs below bases of coxæ pale yellow; apex of clypeus brownish; wings strongly fuscous at base, venation dark brown paler apically.

Florida. One female collected on "Palm."

Type.—Cat. No. 13941, U.S.N.M.

ANEUGMENUS NIGRITARSIS, new species.

Female.—Length 5 mm. Differs from *flavitarsis* by having the middle fovea irregularly circular, and the tarsi (apices of posterior tibiæ) black. Antennæ pilose, tapering, third joint distinctly longer than the fourth.

Male.—Length 5 mm. Very like the female. Hypopygidium broadly rounded apical.

San Rafael, Jicoltepec, Mexico. Female and two males.

Type.—Cat. No. 13940, U.S.N.M.

ANEUGMENUS DIVERSICOLOR, new species.

Easily known from the other species by the second to sixth abdominal segments being ferruginous.

Male.—Length 5.5 mm. Antennal and supraclypeal foveæ shallow and very poorly defined; supraclypeal area flat; middle fovea transverse, not sharply defined; lateral foveæ well defined punctiform; ocellar basin of the type of *flavipes*, but poorly defined

and with the rounded lower wall broken; postocellar area convex, bounded laterally by punctiform foveæ; postocellar line longer than the ocelloccipital but shorter than the ocellocular; antennæ subpilose robust, not tapering, third joint longer than the fourth; stigma rounded beneath, truncate apically; claws with a small basal tooth; hypopygidium broadly subangulate apically. Black; clypeus, labrum, palpi, and anterior tibiæ and tarsi white; tegulæ, legs except most of posterior tibiæ and tarsi, abdominal segments two to six ferruginous. Wings dusky hyaline, iridescent; venation dark brown.

Mexico. One male from the C. F. Baker collection.

Type.—Cat. No. 13942, U.S.N.M.

Genus STROMBOCEROS Konow.

Stromboceros KONOW, Wien. Ent. Zeit., vol. 4, 1885, pp. 19 and 20.
Waldheimia KIRBY, List Hym. Brit. Mus., vol. 1, 1882, p. 326 (not Brullé).
Waldheimia ASHMEAD, Can. Ent., vol. 30, 1898, p. 307 (not Brullé).

Brullé[1] in describing the genus *Waldheimia* named the genotype *Tenthredo brazilensis* Lepeletier. The type of *Tenthredo brazilensis* Lepeletier seems to have been lost, at least it is not in the Museum of Paris, but Konow[2] places as a synonym of Lepeletier's species his *Monophadnus alveatus*, which should stand as a proxytype of *Tenthredo brazilensis* Lepeletier. This makes the genus fall in Konow's *Blennocampides* and not near *Strongylogaster*, as Ashmead and Kirby have it. Ashmead and Kirby probably followed the figure of *Waldheimia orbignyana* Brulle[3] which belongs in *Stromboceros sensu latoriore.*

Stromboceros Konow may be divided into a number of species groups. The following are in the material in the Museum:

Key to Subgenera.

Hind basitarsis much shorter than the following joints; (clypeus truncate). *Eustromboceros* Rohwer.
Hind basitarsis subequal with or longer than the following joints..... 1
1. Clypeus distinctly emarginate.....*Stromboceros* Konow.
Clypeus truncate or nearly.....*Strombocerides* Rohwer.

Subgenus STROMBOCEROS, Sensu Strictiore.

STROMBOCEROS (STROMBOCEROS) BARRETTI, new species.

Female.—Length 6.5 mm. Clypeus with a V-shaped emargination lobes broad, obtuse apically; supraclypeal foveæ connected with the antennal foveæ which are large and extend a little above the lower border of the ocellar basin where they are bounded by a transverse carina; antennal furrows nearly complete above the foveæ; middle fovea oval, well defined; ocellar basin sharply defined, large, V-shaped,

[1] Hist. Nat. Insects Hym., vol. 4, 1846, p. 665.
[2] Zeit. Hym. u. Dipt., vol. 4, 1904, p. 242.
[3] Pl. 46, figs. 8, 8a, 8b, Hist. Nat. Insects Hym.

but entirely inclosed; postocellar furrow wanting; postocellar area transverse sharply bounded laterally; postocellar line subequal with the ocellocipital line but much shorter than the ocellocular line; antennæ pilose, tapering, third joint distinctly longer than the fourth, pedicellum much longer than broad; stigma angled near the base, strongly tapering; transverse radius in apical third of cell; third cubital cell shorter than the second, much broader apically; transverse median in about the middle of the cell; lanceolate cell of the hind wings sessile; hind basitarsis slightly longer than the following; claws with a large basal tooth, at some angles appearing cleft; sheath obliquely rounded apically. Rufo-ferruginous; antennæ, head (except pallid palpi), pro-pleurse and sternum, meso-and meta-pleurse and sternum, posterior tibiæ and tarsi black; intermediate tarsi brownish; wings dusky hyaline, venation dark brown.

Tacubaya, Mexico. One female collected by O. W. Barrett for whom the species is named. Doctor Ashmead's manuscript name is used for this species.

Type.—Cat. No. 14000, U.S.N.M.

STROMBOCERIDIA, new subgenus.

Genotype.—Stromboceros (Stromboceridea) pilosulus Rohwer.

The following species all have the pedicellum much longer than broad.

STROMBOCEROS (STROMBOCERIDEA) PILOSULUS, new species.

Female.—Length 8 mm. Clypeus convex, apex nearly truncate; supraclypeal area flat; supraclypeal foveæ very shallow connected with the antennal foveæ which are small; middle fovea shallow subquadrate, with a glabrous spot in the center; lateral foveæ punctiform a little above the level of the middle fovea; antennal furrows incomplete present at intervals; ocellar basin with sharp ridges laterally which meet above, open below; a small fovea in front of the anterior ocellus; postocellar area subquadrate, sharply defined laterally; postocellar line shorter than the ocelloccipital and ocellocular lines; front below the ocelli roughened; eyes nearly parallel; antennæ subpilose, robust, apical joints flattened, tapering, third joint nearly as long as the fourth and fifth, pedicellum much longer than broad; stigma tapering; transverse radius near apex of cell; transverse median but little beyond the middle; lanceolate cell of the hind wings sessile; hind basitarsis slightly longer than the following; claws cleft, the inner tooth shorter. Black; clypeus, labrum, first two antennal joints, base of third, prothorax, tegulæ, legs (except most of hind femora and apex of hind tibiæ) pale yellow; sides of mesoprescutum, scutellum, upper part of mesoepisternum, three basal abdominal segments reddish-yellow; wings yellowish-hyaline; costa and stigma reddish, rest of the venation dark brown; front, clypeus, thorax and legs with yellowish pile.

Cordoba, Mexico. One female collected June 14, 1905, by F. Knab.
Type.—Cat. No. 14001, U.S.N.M.

STROMBOCEROS (STROMBOCERIDEA) PLESIUS, new species.

Related to *Stromboceros maculipennis* (Cameron), which belongs to the same group, but the mesoprescutum is margined with a cream colored band, and the antennæ are not as strongly spinose beneath.

Female.—Length 10 mm. Clypeus truncate, lateral angles rounded; supraclypeal foveæ very small, punctiform; antennal foveæ wanting as are also the antennal furrows; middle fovea hardly defined, large and shallow; lateral foveæ small, punctiform; ocellar basin wanting; postocellar line much shorter than the ocelloccipital or ocellocular line; postocellar area transverse, well defined laterally; eyes nearly parallel; antennæ pilose, long tapering, third joint but very little longer than fourth, pedicellum much longer than broad; stigma nearly parallel sided, sharply, obliquely truncate; venation as *maculipennis;* lanceolate cell of hind wings sessile; hind basitarsis subequal with the following joints; claws cleft; sheath narrow obtusely rounded. Creamish-yellow; flagellum, head above middle of eyes, middle of mesoprescutum, mesoscutum, scutellum, mesosternum, mesoepimeron, apical three abdominal segments, apical four joints of intermediate tarsi, apex of posterior tibiæ and their tarsi *black.* Wings black with a broad yellow band in the middle, venation the color of wings.

Santa Rosa, Mexico. One female collected by William Schaus.
Type.—Cat. No. 14002, U.S.N.M.

STROMBOCEROS (STROMBOCERIDEA) URICHI, new species.

Male.—Length 7.5 mm. Clypeus broadly rounded; supraclypeal area flat; supraclypeal foveæ small punctiform; antennal foveæ very shallow, poorly defined; antennal furrow nearly complete, but not sharply defined; middle and lateral foveæ punctiform, the latter above the former and much better defined; ocellar basin small, just around the ocellus; postocellar furrow wanting; postocellar line subequal with the ocelloccipital line, much shorter than the ocellocular line; postocellar area transverse; pedicellum much longer than broad, rest of the antennæ wanting; stigma rounded below, truncate apically; transverse radius in apical third; third and second cubital cells subequal; transverse median somewhat beyond the middle; lanceolate cell of the hind wings sessile; hind basitarsis subequal with the following joints; claws with an erect inner tooth; hypopygidium narrow, broadly rounded apically. Pale yellowish; pedicellum, posterior orbits and head above the middle of the eyes, mesoscutum, intermediate tarsi, most of the posterior tibiæ, their tarsi black; apex of the abdomen brownish; wings hyaline, slightly brownish apically; venation pale brown; stigma yellowish.

Trinidad, West Indies. One male collected by F. W. Urich, July, 1899. Doctor Ashmead's manuscript name is used for this species. Named for the collector.

Type.—Cat. No. 14003, U.S.N.M.

STROMBOCEROS (STROMBOCERIDEA) PALLIDICORNIS, new species.

Apical joints of antennæ, thorax and abdomen marked with yellow.

Female.—Length 6 mm. Clypeus gently, arcuately emarginate; middle and frontal foveæ small, shallow, subcircular in outline; antennal furrows very poorly defined, incomplete; ocellar basin large, extending almost to the bases of antennæ, walls rounded, stronger below; postocellar line distinctly shorter than the ocellocular line and but little shorter than the ocelloccipital line; antennæ slender, pilose, wanting beyond the sixth joint, third and fourth joints subequal; stigma angulate near base, tapering to the apex; second cubital cell slightly longer than the third; transverse median vein slightly beyond the middle of cell; tibiæ and tarsi pilose; calcaria short and stout; sheath slender, straight above, obliquely truncate at apex, gradually broadening basally. Black and yellow; the following parts black; head (except clypeus, labrum, mandibles apicies of later piceous), third and base of fourth antennal joints, propleuræ, middle of mesoprescutum, mesoscutum, meso- and metapleuræ and sturnum (except a large spot on mesoepisturnum), posterior legs below trochanters (except apicies of femora), spot on apical dorsal segments and sheath black; wings dusky hyaline; venation black. Intermediate tarsi are sometimes dusky.

Medan, Sumatra. Six females collected by L. B. du Bussey.

Type.—Cat. No. 14004, U.S.N.M.

EUSTROMBOCEROS, new subgenus.

Genotype.—*Stromboceros* (*Eustromboceros*) *melanopterus* Rohwer.

* PEDICELLUM WIDER THAN LONG.

STROMBOCEROS (EUSTROMBOCEROS) MELANOPTERUS, new species.

Rufo-ferruginous marked with black; hind tibiæ and tarsi black.

Female.—Length, 8.5 mm. Clypeus truncate; supraclypeal foveæ deep, circular; antennal foveæ poorly defined below, V-shaped above; ocellar basin bounded by line-like carina which extends between the bases of antennæ, making the basin diamond shape; antennal furrows wanting; a depressed area outside each lateral ocellus; postocellar furrow angular; postocellar area transverse; postocellar line shorter than the ocelloccipital and much shorter than the ocellocular; antennæ subpilose, stout, filiform, third joint but little longer than the fourth pedicellum, much broader than long; stigma hardly tapering, apex obliquely truncate; transverse radius but a little distance beyond middle of cell; transverse median less than its length from apex of cell; lanceolate cell of hind wings sessile; hind basitarsis subequal with

length of two following joints. Rufo-ferruginous; antennæ, head (except clypeus, labrum, and base mandibles), spots on mesoscutum and mesoprescutum, mesosternum, sheath, intermediate tarsi, posterior tibiæ and tarsi black; wings black.

Federal District of Mexico. One female from Guillarmo Gandara.

Type.—Cat. No. 14005, U.S.N.M.

STROMBOCEROS (EUSTROMBOCEROS) XANTHOGASTER, new species.

Male.—Length 8 mm. May be the male of *S. melanopterus* but differs in the following color characters: Thorax (except the pronotum) and basal plates black. Hypopygidium broadly rounded apically, tipped with black.

Federal District of Mexico. One male from Guillarmo Gandara.

Type.—Cat. No. 14006, U.S.N.M.

STROMBOCEROS (EUSTROMBOCEROS) GANDARAI, new species.

Wings black, head black.

Male.—Length 8.5 mm. Clypeus truncate; supraclypeal foveæ deep, punctiform; antennal foveæ shallow, not well defined; supraclypeal area nearly flat; lateral foveæ punctiform, a little above the level of the middle fovea; middle fovea transverse oval well defined; antennal furrows wanting; ocellar basin large, rectangular, not sharply defined above; postocellar area transverse, sharply defined laterally; postocellar line longer than the ocelloccipital but shorter than the ocellocular lines; eyes strongly converging to the clypeus; antennæ subpilose, filiform, the third and fourth joints subequal, pedicellum wider than long; stigma strongly tapering; transverse radius but little beyond the middle of cell; third cubital cell longer than the fourth; cubitus with a spurious vein near the base; transverse median less than its length from middle; lanceolate cell of the hind wings sessile; hind basitarsis much shorter than the following joints; hypopygidium short, broadly rounded apically. Black; pronotum, small lateral spots of anterior part of mesoprescutum, tegulæ, first perapteron, upper part of mesoepimeron, posterior face of mesoscutum, dorsal abdominal segments three to six, rosy red (perhaps due to potassium cyanide), four anterior tibiæ and apical part of femora beneath, posterior knees pale yellowish; wings black.

Federal District of Mexico. One male from Guillermo Gandara, entomologist of Estacion Agricola Central, for whom the species is named.

Type.—Cat. No. 14007, U.S.N.M.

** PEDICELLUM MUCH LONGER THAN WIDE.

STROMBOCEROS (EUSTROMBOCEROS) LEUCOSTOMUS, new species.

Superficially like *Stromboceros* (olim *Selandria*) *curialis* (Cresson), but that species has the third joint of the antennæ longer than four plus five, and the hind basitarsis as long as the following joints.

Female.—Length 8.5 mm. Clypeus rather shallowly arcuately emarginate anteriorly, basally transversely convex; antennal and supraclypeal foveæ confluent; middle fovea large, subquadrate, well defined; lateral foveæ sharply defined, confluent with the large antennal foveæ below, above the level of the middle fovea; ocellar basin triangular in outline, better defined above; frontal crest well defined; antennal furrows complete to the crest from the occiput; postocellar furrow curved anteriorly; postocellar line shorter than the occlocipital or ocellocular; postocellar area subquadrate; antennæ pilose, short, tapering beyond middle, third joint longer than the fourth and fifth; stigma tapering; transverse radius in apical fourth of cell; transverse median much beyond the middle; lanceolate cell of the hind wings sessile; hind basitarsis much shorter than the following. Black; clypeus, labrum, apical joints of palpi, narrow posterior margin of pronotum, tegulæ, four anterior femora beneath, apicies of coxæ, trochanters, bases of posterior femora, tibiæ except apicies (the band is incomplete on the four anterior ones) and anterior tarsi white. Wings dusky hyaline, iridescent; venation black.

Federal District of Mexico. One female from Guillermo Grandara of Estacion Agricola Central.

Type.—Cat. No. 14008, U.S.N.M.

Genus STRONGYLOGASTER Dahlbom.

STRONGYLOGASTER TUBERCULICEPS, new species.

Readily distinguished from *Strongylogaster tacitus* Norton by the strongly parted postocellar area, shining ocellar and frontal areas and the better defined ocellar basin.

Female.—Length 7 mm. Clypeus angulately emarginate, lobes broad, triangular, surface very coarsely sculptured; supraclypeal foveæ large, circular in outline; supraclypeal area subconvex, smooth shining; antennal foveæ large sharply defined, and subangulate above; antennal furrows complete from the foveæ, deeper at the postocellar area; middle fovea small, oval in outline; ocellar basin shining, well defined laterally, triangular in outline; postocellar furrow poorly defined; postocellar line shorter than either the ocelloccipital or ocellocular; postocellar area strongly convex, parted in the middle which makes it appear bituberculate; first and second flagellar joints subequal; head shining, with irregularly scattered, distinct punctures; mesonotum shining, practically impunctuate; third cubital cell much longer than the second receiving the transverse radius near apical third; transverse median somewhat beyond the middle; sheath obtusely rounded apically. Black; anterior tibiæ

brownish beneath; abdomen except apex of sheath rufoferruginous. Wings and venation black.

Tampa, Florida. One female collected April 28.

Type.—Cat. No. 14009, U.S.N.M.

STRONGYLOGASTER MELANOGASTER, new species.

Differs from *Strongylogaster uncus* Norton in the black abdomen, and more broadly truncate hypopygidium.

Male.—Length 7 mm. Clypeus with a rather narrow arcuate emargination, lobes broad obtusely pointed; supraclypeal area strongly convex; supraclypeal foveæ deep, circular in outline; antennae foveæ narrow, elongate, sharply defined; antennal furrows present, but poorly defined from foveæ, nearly complete subpunctiform at postocellar area; middle fovea rather large, circular in outline; ocellar basin subtriangular, shining, poorly defined; postocellar furrow present; postocellar line slightly longer than the ocelloccipital but shorter than the ocellocular; postocellar area shining, transverse, not parted; third and fourth antennal joints subequal; front very closely punctured, occiput very sparsely so; pronotum punctured; mesothorax shining, nearly impunctate; third cubital cell much longer than the second, receiving the transverse radius near apical third; transverse median beyond the middle; hypopygidium broadly truncate. Black; mesoepimeron, mesoprescutum and scutum, rufous; tip of clypeus and anterior tibiæ beneath brownish. Wings and venation black.

Jacksonville, Florida, two males; St. Nicholas, Florida, four males. All from the Ashmead collection.

Type.—Cat. No. 14010, U.S.N.M.

Genus HEMITAXONUS Ashmead.

Epitaxonus MacGillivray, Can. Ent., vol. 40, 1908, p. 365.

The characters offered by Rohwer[1] to separate *Epitaxonus* from *Hemitaxonus* are not even of specific value. In a bred series of *Hemitaxonus dubitatus* the relative length of the third cubital cell and the appendiculation of the hind radial cell varies considerably. The other characters are of but little value, the relative difference between the length of the joints of maxillary palpi and hind tibiæ is not great enough to be of any value.

HEMITAXONUS DUBITATUS var. AMICUS (Norton).

Taxonus albidopictus Dyar, Journ. New York Ent. Soc., vol. 5, 1897, p. 20.
Hemitaxonus albidopictus Rohwer, Proc. U. S. Nat. Mus., vol. 38, 1910, No. 1739, p. 204.

The specimens in Doctor Dyar's collection labeled *Taxonus albidopictus*, which were reared from the larvæ described in the above

[1] Can. Ent., vol. 42, 1910, p. 50.

reference, are typical specimens of *amicus* (Norton), agreeing exaycti with the type. Doctor Dyar writes that, "The larvæ of these two species [*dubitatus* and *amicus*] of *Taxonus* can not be certainly distinguished." The adults offer only varietal differences, if that. Norton, in the original description, suggested that *amicus* would only be a variety of *dubitatus*.

HEMITAXONUS ALBIDOPICTUS (Norton).

Taxonus albidopictus NORTON, Trans. Amer. Ent. Soc., vol. 2, 1868, p. 213, No. 6.
Hemitaxonus rufopectus ROHWER, Proc. U. S. Nat. Mus., vol. 38, No. 1738, 1910, p. 204.

There can be no doubt about this synonymy.

Genus SCOLIONEURA Konow.

SCOLIONEURA LUTEOPICTA, new species.

May be separated from *S. populi* Marlatt by the following comparison:

Scolioneura populi Marlatt.	*Scolioneura luteopicta* Rohwer.
FEMALE.	FEMALE.
1. Middle fovea somewhat pryiform, broader below.	1. Middle fovea smaller, rectangular in outline.
2. Antennal furrows without a distinct punctiform fovea below the level of ocelli.	2. Antennal furrows with a distinct punctiform fovea below the level of ocelli.
3. Ocellar basin rather well defined.	3. Ocellar basin hardly defined.
4. Postocellar area not parted.	4. Postocellar area parted by a faint median furrow.
5. Apical antennal joint rounded at the apex, subequal with the preceding.	5. Apical antennal joint tapering and distinctly longer than preceding.
6. Antennal furrows black.	6. Antennal furrows pale, except the punctiform fovea.
MALE.	MALE.
7. Pectus black.	7. Pectus pale.

Brookings, South Dakota. Two males and one female bred from cottonwood (*Populus*) June 20, 1892.

Type.—Cat. No. 14011, U.S.N.M.

Genus EMPRIA Lepeletier.

EMPRIA SCHWARZI, new species.

Related to *Empria maculata* (Norton), but may be known from that species by the black clypeus, darker venation, depressed area in the top of inner orbits, and more shining dorsulum. The black clypeus, dark venation, annulated posterior legs, and robust truncate sheath are characters to help distinguish this species.

Female.—Length, 7 mm. Labrum rounded on the anterior margin; clypeus emarginate, with a small inner tooth, a poorly defined carina, the surface coarsely granular, antennal fovea large, extending much above the insertion of the antennæ; a low hump between the antennæ; middle fovea small, well defined; antennal furrows nearly complete; V-shaped depressions below and above the anterior ocellus; postocellar line present; the area near the top of the inner orbits somewhat depressed; head rather coarsely granular below the supraorbital line, shining above it; antennæ very like *maculata;* dorsulum shining; stigma broadest at the base, tapering to the apex; first transverse cubitus wanting; sheath robust, truncate; saw dark, with strong, sharp teeth pointing toward the base near the apex, the base without teeth, the upper part not dentate, rather irregular. Black; labrum, apical palpi joints; four anterior legs below femora and the trochanters, basal half of posterior tibiæ and post-basitarsis, yellowish-white; the usual abdominal spots greenish-white; wings clear hyaline, venation black; eyes in life dark-iridescent green.

Plummer's Island, Potomac River, Maryland. One female collected by E. A. Schwarz.

Type.—Cat. No. 14012, U.S.N.M.

Genus AMETASTEGIA A. Costa.

Taxonus (subgenus) ROHWER, Proc. U. S. Nat. Mus., vol. 39, No. 1777, 1910, p. 111.

Aomodyctium ASHMEAD, Can. Ent., vol. 30, 1898, p. 309.

Taxonus (Mac Gillivray) VIERECK, New Jersey State Mus., (1909) 1910, p. 582 (part).

The incorrect remarks about the type of the genus *Taxonus*[1] when corrected does not make *Ametastegia* a synonym of *Taxonus,* but leaves it the first name available for the subgenus *Taxonus* as defined by Rohwer.[2] The genus *Aomodyctium* Ashmead was founded on a male of *Strongylogaster abnormis* Provancher, which belongs to *Ametastegia. Aomodyctium* Ashmead is, therefore, a synonym of the older genus *Ametastegia* A. Costa. The hind basitarsis is shorter than the following joints. Those who hold that a genus is without standing until it has a species placed in it will accredit the genus *Aomodyctium* to the present paper.

EMPHYTINA, new subgenus.

Genotype.—Emphytina pulchella Rohwer.

Separated from *Ametastegia* Costa (s. s.) by somewhat different habitus and loss of the first transverse cubitus. The species belong-

[1] See Proc. U. S. Nat. Mus., vol. 39, No. 1777, p. 111; Bull. Tech. Ser. No. 20, pt. 2, U. S. Dep. Agr., Bur. Ent., 1911, p. 95.

[2] Proc. U. S. Nat. Mus., vol. 39, 1910, p. 111.

ing here have usually been placed in *Emphytus* Klug. Includes the following species: [Nearctic] *canadensis* (Kirby), *inornatus* (Say), *aperta* (Norton) *angustus* (Kincaid), *pulchella* Rohwer, *virginica* Rohwer, *pallidiscapa* Rohwer, *plesia* Rohwer, *stramineipes* (Cresson); [Palæarctic] *grossulariæ* (Klug), *tener* (Fallén), *carpini* (Hartig), *perla* (Klug). More of the Palæarctic species may belong here, but these are all that at present can be placed with any certainty.

Key to Nearctic species.

Abdomen black, not marked with pale; clypeus black or mostly 1
Abdomen strongly marked with pale; clypeus white 2
1. Angles of pronotum pale; a pale spot above intermediate coxæ; stigma narrow elongate, hardly rounded below ..... *inornatus* (Say).
Angles of pronotum black; pleuræ all black; stigma shorter, robust, rounded below ..... *canadensis* (Kirby).
2. Pectus and lower part of pleuræ pale 3
Pectus black 6
3. Middle fovea large, subcircular, rather deep ..... *pulchella* Rohwer.
Middle fovea wanting or at most indicated 4
4. Scape pale; postocellar line present ..... *pallidiscapa* Rohwer.
Scapa black; postocellar line wanting 5
5. Lobes of the clypeus obtuse ..... *stramineipes* (Cresson).
Lobes of the clypeus acute ..... *virginica* Rohwer.
6. Scape pale; clypeus slightly emarginate ..... *angustus* (Kincaid).
Scape black; clypeus deeply emarginate ..... { *aperta* (Norton). *plesia* Rohwer.

EMPHYTINA PULCHELLA, new species.

Female.—Length, 6.5 mm. Clypeus arcuately emarginate, lobes obtuse; supraclypeal area convex; supraclypeal foveæ and antennal foveæ confluent, large; middle fovea sharply defined, circular in outline; ocellar region raised; ocellar basin wanting; antennal furrows wanting; postocellar furrow wanting; postocellar area defined laterally by punctiform foveæ; postocellar line shorter than either the ocelloccipital or ocellocular; third antennal joint distinctly longer than the fourth, antennæ pilose; stigma rounded on the lower margin; sheath as in figure 4. Black; clypeus, labrum, posterior margin of the pronotum, tegulæ, lower part of the mesoepisternum, mesosternum; legs entirely and venter white; middle of dorsal segment rufoferruginous (narrowing laterally). Wings hyaline, iridescent; venation dark brown, base of stigma pallid.

FIG. 4.—APEX OF THE SHEATH OF AMBLASTEGIA (EMPHYTINA) PULCHELLA ROHWER. FIGURE TO THE LEFT OF THE TYPE TO THE RIGHT OF THE PARATYPE.

Germantown, Pennsylvania. One female collected May 2, 1910. Chicopee, Massachusetts, one female May 17, 1897.

Type.—Cat. No. 13977, U.S.N.M.

EMPHYTINA VIRGINICA, new species.

Female.—Length 6 mm. Clypeus broadly arcuate, lobes broad, obtuse; supraclypeal area convex; supraclypeal and antennal foveæ confluent; middle fovea wanting; antennal furrows wanting; ocellar area raised, ocellar basin wanting; postocellar area not defined; postocellar line shorter than the ocelloccipital; ocelloccipital line and ocellocular line subequal; antennal joint three longer than four, antennæ pilose; stigma broad, rounded below; sheath as in figure 5. Black; clypeus, labrum, palpi, tegulæ, posterior margin of pronotum, lower part of mesoepisternum, mesosternum, legs and venter white; dorsal segments in the middle rufoferruginous (narrowed laterally). Wings hyaline iridescent; venation dark brown.

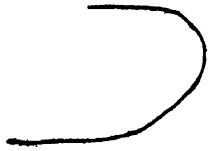

FIG. 5.—APEX OF THE SHEATH OF AMETASTEGIA (EMPHYTINA) VIRGINICA ROHWER. DRAWING FROM THE TYPE.

Dixie Landing, Virginia. One female. Collected May 27 by C. L. Marlatt.

Type.—Cat. No. 13978, U.S.N.M.

EMPHYTINA PALLIDSCAPA, new species.

Female.—Length 5 mm. Like *virginica*, except as follows: Clypeus subsquarely emarginate, lobes obtuse; postocellar area faintly defined all the way around; stigma broader at base; sheath as in figure 6; scape white; venation pale brown; dorsal spots smaller.

FIG. 6.—APEX OF THE SHEATH OF AMETASTEGIA (EMPHYTINA) PALLIDSCAPA ROHWER. DRAWING FROM A PARATYPE

Male.—Length 4.5 mm. Sufficiently like the female to be easily associated with it; postocellar area not defined, hypopygidium broadly rounded.

Washington, District of Columbia (?). Described from a number of males and females recorded under Bureau of Entomology number 3329. The following note for February, 1884, made by Mr. A. Koebele is of interest: "Found under bark of black birch (*Betula nigra*), near ground, large numbers of saw-fly larvæ which had hibernated; some of them seem to be parasitized." Microgasterine and Chalcid parasites later issued from some of these larvæ.

Type.—Cat. No. 13979, U.S.N.M.

EMPHYTINA STRAMINEIPES (Cresson).

The following notes from the type may be worth while: Postocellar area bardly defined laterally; middle foveæ and ocellar basin wanting; clypeus subsquarely emarginate, lobes obtuse; sheath differing from *virginica* in being more oblique below.

EMPHYTINA PLESIA, new name.

Emphytus leucostomus ROHWER, Journ. New York Ent. Soc., vol. 16, 1908, p. 110; not Costa, Rend. Acc. Sci. Gis. Napoli, 1890, p. 172.

"Once a homonym always a homonym." This is close to *aperta* (Norton).

FIG. 7.—APEX OF THE SHEATH AND THE LOWER GONAPOPHYSES OF AMETASTEGIA (EMPHYTINA) CANADENSIS (KIRBY). DRAWING FROM A SPECIMEN BRED BY DR. H. G. DYAR AND RECORDED IN THE CANADIAN ENTOMOLOGIST, VOL. 26, 1894, P. 185. LARVA ON VIOLA TRICOLOR LINNÆUS

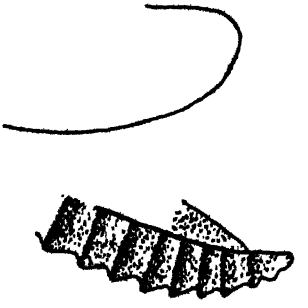

FIG. 8.—APEX OF THE SHEATH AND SAW OF AMETASTEGIA (EMPHYTINA) CANADENSIS (KIRBY). FROM A SPECIMEN BRED IN WASHINGTON, D. C., FROM LARVÆ FEEDING ON VIOLETS, THE LARVÆ WERE COLLECTED AT POUGHKEEPSIE, NEW YORK.

EMPHYTINA CANADENSIS (Kirby).

The accompanying figures show variation in the saw and sheath of this species. In other respects the specimens are practically the same.

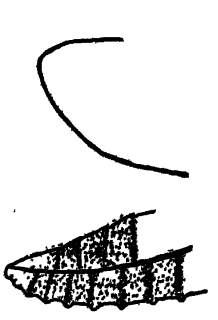

FIG. 9.—APEX OF THE SHEATH AND SAW OF AMETASTEGIA (EMPHYTINA) APERTA (NORTON). THIS SPECIMEN WAS NOT COMPARED WITH THE TYPE, BUT AGREES WITH A SPECIMEN WHICH IS SUPPOSED TO BE THIS SPECIES IN THE COLLECTION OF THE MUSEUM.

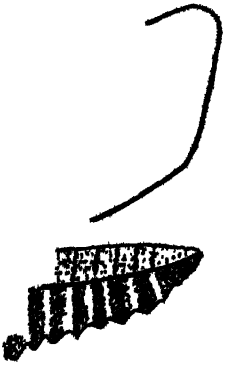

FIG. 10.—APEX OF THE SAW AND SHEATH OF AMETASTEGIA (EMPHYTINA) INORNATA (SAY). DRAWING OF A SPECIMEN WHICH AGREES EXACTLY WITH A PROXYTYPE MADE BY ROHWER IN THE MUSEUM COLLECTION.

Genus PSEUDOSIOBLA Ashmead.

Pseudosiobla Ashmead will probably be classed as subgenus of *Siobla* Cameron, separated from it by the shorter pedicellum and only one (in some cases none) discal cell in the hind wings—in *Siobla* there are two. *Siobla* Kirby [1] is a composite group.

Key to North American species.

Females..... 1
Males..... 3
1. Sheath sharply truncate, subparallel-sided; second cubital cell not much shorter than the second; clypeus white.....*cephalanthi* Rohwer.
Sheath rounded below, not subparallel-sided; second cubital cell distinctly shorter than the second; clypeus mostly black..... 2
2. Stigma tapering, not truncate apically; posterior orbits closely punctured.....*excavata* (Norton).
Stigma rounded below, truncate apically; posterior orbits and occiput sparsely punctured.....*robusta* (Kirby).
3. Stigma tapering, not truncate apically (clypeus mostly black; posterior orbits closely punctured).....*excavata* (Norton).
Stigma rounded below, truncate apically..... 4
4. Clypeus black; third antennal joint subequal with the fourth and fifth.
floridana (Provancher).
Clypeus yellow; third antennal joint distinctly shorter than the fourth and fifth.....*cephalanthi* Rohwer.

PSEUDOSIOBLA ROBUSTA (Kirby).

This species was originally described from Georgia. In the National Museum collection is a female from Texas (Belfrage collection), which agrees exactly with Kirby's description and manuscript notes from the type.

PSEUDOSIOBLA FLORIDANA (Provancher).

Type.—Cat. No. 13965, U.S.N.M.

Dr. A. D. Mac Gillavray [2] gives this as a synonym of *robusta* (Kirby). It is perhaps better to keep them separate for the present, as *floridana* has the posterior orbits closely punctured; the basal dorsal segments finely aciculate (in *robusta* only the base of the second is aciculate); and the wings are darker. In the associated males and females this antigeny does not occur. The stigmal and cubital venation is as in *robusta*.

FIG. 11.—THE STIGMAL VENATION AND SHEATH OF PSEUDOSIOBLA ROBUSTA (KIRBY).

[1] List Hym. Brit. Mus., vol. 1, p. 250, etc.

[2] Can. Ent., vol. 40, 1908, p. 366.

PSEUDOSIOBLA EXCAVATA (Norton).

A homotype (det. Rohwer) of this species came from Lake Forest, Illinois, and is labeled "button bush." It is no doubt one of the lot collected by Doctor Needham.[1] Specimens of this species are also from Canada, and Long Island. The figure is of the homotype.

PSEUDOSIOBLA CEPHALANTHI, new species.

Unknown larva 5 c DYAR, Can. Ent., vol. 27, 1895, p. 339.

Siobla excavata DYAR, Journ. New York Ent. Soc., vol. 5, 1897, p. 190.

Pseudosiobla excavata HOWARD, Insect Book, 1904, pl. 13, fig. 7.

FIG. 12.—THE STIGMAL VENATION AND SHEATH OF PSEUDOSIOBLA EXCAVATA (NORTON).

Female.—Length 10 mm. Clypeus with a slight median arcuation; antennal furrows complete but not strong; antennal foveæ poorly defined; postocellar line slightly shorter than the ocelloccipital line and much shorter than the ocellocular; head nearly uniformly, coarsely punctured; third antennal joint subequal with the fourth and fifth; propodeum granular; second and third dorsal segments aciculato-granular, the following very finely granular; hind basitarsis curved. Black; clypeus, labrum, posterior margin of pronotum, spot or side of pronotum, spot on tegulæ, propodeum, trochanters, basal two-thirds of four hind tibiæ whitish; two basal joints of antennæ, anterior tibiæ and tarsi yellow; apex of four posterior tibiæ and their tarsi, and second dorsal segment rufous; dorsal abdominal segments piceous; wings dusky hyaline, venation dark brown (black basally) base of stigma yellow.

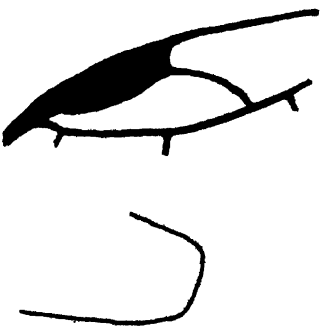

FIG. 13.—THE STIGMAL VENATION AND SHEATH OF PSEUDOSIOBLA CEPHALANTHI ROHWER.

Male.—Length 10 mm. Similar to female. Abdomen not piceous; third antennal joint distinctly shorter than the fourth and fifth; hypopygidium sharply rounded apically.

Near New York City, New York. Three females and seven males bred from larvæ on *Cephalanthus occidentalis* (button bush) by H. G. Dyar and described as *Siobla excavata*.[2]

Type.—Cat. No. 13966, U.S.N.M.

[1] Psyche, vol. 10, 1903, p. 27.

[2] Journ. New York Ent. Soc., vol. 5, 1897, p. 190.

Genus TAXONUS Hartig.

Subgenus PARASIOBLA Ashmead.

TAXONUS (PARASIOBLA) RUFOCINCTUS VIRGINICUS, new variety.

Differs from the typical *rufocinctus* (according to a proxytype in the American Entomological Society collection made by Rohwer in June, 1909) in having the abdomen beyond the basal plates entirely rufous. This variation occurs with the typical form in Virginia, but as exhibited by many individuals from Mr. Nathan Banks' collection is more abundant than the typical form. In some few specimens the apical dorsal segments are slightly brownish. Males and females.

Great Falls, Glencarlyn, and Falls Church, Virginia; Ithaca, New York. Collected by N. Banks. Dixie Land, Virginia, collected by C. L. Marlatt.

Type.—Cat. No. 13840, U.S.N.M.

Paratype in collection of Mr. Banks.

Genus DIMORPHOPTERYX Ashmead.

Key to species.

Mesoprescutum rufous; basal plates pale.....*abnormis* Rohwer.
Mesoprescutum black; basal plates black..... 1
1. Apical four abdominal segments black; (mandibles, antennæ, clypeus and labrum black).....*melanognathus* Rohwer.
Abdomen beyond basal plates pale, sheath black..... 2
2. Females (scutellum yellow)..... 3
Males (scutellum black)..... 5
3. Antennæ black.....*pinguis virginica* Rohwer.
Antennæ pale..... 4
4. Ocellar basin with well defined lateral walls which extend to the bases of antennæ; clypeus subangulate emarginate.....*pinguis pinguis* (Norton).
Ocellar basin with the lower lateral walls not sharply defined and reaching the bases of the antennæ as rounded ridges; clypeus subsquarely emarginate.
pinguis errans Rohwer.
5. Antennæ black; ocellar basin with rounded walls; fifth to eighth joints of antennæ beneath with an apical projection.....*pinguis errans* Rohwer.
Antennæ brown; walls of ocellar basin well defined; fifth to eighth antennal joints without projection beneath.....*pinguis virginica* Rohwer.

DIMORPHOPTERYX PINGUIS (Norton).

The type of Norton's *pinguis* is not in the collection of the American Entomological Society, and appears to be lost. A specimen which agrees with the original description and with specimens which were supposed to be determined by Norton is taken as the proxytype.[1] Dr. H. G. Dyar has bred what was considered to be this species from birch, linden, sugar plum (*Amelanchier canadensis*), maple, and

[1] The word "proxytype" is used to designate a specimen chosen (and labeled as proxytype) as the type by a subsequent author when the real type has been destroyed or lost.

black oak. It is impossible to determine if these are all *pinguis* as here restricted. The male is not in the collection of the United States National Museum.

DIMORPHOPTERYX PINGUIS ERRANS, new variety.

Parasiobla rufocinctus HOWARD, Insect Book, 1904, pl. 14, fig. 26.

Besides the characters given in the above table this variety may be separated by the anterior margin of the clypeus being pale.

Two females and two males from the collection of Dr. H. G. Dyar. One of the females from Bellport, New York, June 12.

Type.—Cat. No. 13843, U.S.N.M.

DIMORPHOPTERYX PINGUIS VIRGINICA, new variety.

Female.—Falls Church, Virginia, June 28; female, Washington, District of Columbia, June 22; male, Glencarlyn, Virginia, June 28. All collected by N. Banks.

Type.—Cat. No. 13842, U. S.N.M.

DIMORPHOPTERYX MELANOGNATHUS Rohwer.

Dimorphopteryx melanognathus ROHWER, Proc. U. S. Nat. Mus., vol. 39, No. 1739, 1910, p. 205.

Known from the unique female type.

DIMORPHOPTERYX ABNORMIS, new species.

Very distinct in color, strongly punctured mesoscutum, elevated scutellum.

Female.—Length 6 mm. Labrum broadly rounded apically; clypeus sparsely punctured, shallowly emarginate apically, lobes hardly defined; head as in *pinguis*, except the rounded walls of the ocellar basin; antennæ typical not nodose at apex beneath; mesoscutum and prescutum with rather close well defined punctures; mesoepisternum very coarsely punctato-reticulate; scutellum closely, strongly punctured, elevated; venation normal except that the transverse radius is entirely wanting; sheath obtusely pointed apically. Black; clypeus, labrum, mandibles (apicies piceous), tegulæ, legs (apicies of posterior femora black) and entire abdomen rufo-ferruginous (parts of legs somewhat paler); antennæ, mesoprescutum, and posterior margin of pronotum rufous; scutellum yellow; wings hyaline, venation pale brown.

Male.—Length 6 mm. Differs from the female in the rufous scutellum and upper part of mesoepisternum; hypopygidium obtusely rounded.

A female paratype shows that the mesoepisternum may be rufous in the female.

Ottawa, Canada. Two females and one male bred from larvæ on cultivated plum in 1900.

Type.—Cat. No. 13841, U.S.N.M.

The complete loss of the transverse radius in all the specimens may indicate an abnormal development or if constant in a large series together with the elevated scutellum might constitute characters for a subgenus.

Genus ALLANTUS Panzer.

Emphytus KLUG.

The genus *Allantus*, a monobasic genus, was established by Panzer in 1801 [1] and has *Tenthredo* (*Allantus*) *togata* Panzer as the type. It therefore replaces *Emphytus* Klug. 1813. *Allantus* Auctorum equals *Tenthredo* Linnæus. [2]

Key to Nearctic and other species of Allantus.

Posterior femora red or reddish..... 1
Posterior femora black..... 2
1. Four anterior femora pale.....*mellipes* (Norton).
Four anterior femora blackish.....*gillettei* (MacGillivray).
2. Posterior tibiæ black and white.....*cinctus nigritibialis* Rohwer.
Posterior tibiæ red and white..... 3
3. Sheath sharply truncate; furrows bounding the postocellar area, joining the postocellar furrow in middle of the lateral ocelli.....*cinctus cinctus* (Linnæus).
Sheath rounded below; furrows bounding the postocellar area joining the postocellar furrow well outside the lateral ocelli.....*cinctus cinctipes* (Norton).

A. mellipes (Norton) seems to be close to *A. cingillum* (Klug.).

ALLANTUS CINCTUS NIGRITIBIALIS, new subspecies.

Female.—Length 7.5 mm. Closest to *cinctus cinctipes* (Norton), but may be separated by the above table.

FIG. 14.—FIGURES OF THE APICES OF THE SHEATHS OF SPECIES OF ALLANTUS. *a*, *b*, OF A. CINCTUS CINCTIPES (NORTON); *c*, *d*, OF A. CINCTUS NIGRITIBIALIS ROHWER; *c* IS FROM THE SPECIMEN FROM JAPAN; *d*, OF THE SPECIMEN FROM CHINA; *e*, OF A. GILLETTEI (MAC GILLIVRAY); *f*, OF A. CINCTUS CINCTUS (LINNÆUS); *g*, OF A. MELLIPES (NORTON).

One female "crawling on Hemlocks, from Japan" collected by J. B. Smith at Rutherford, New Jersey, April 15, 1911. One female from Hong Kong, China, collected by A. Koebele.

Type.—Cat. No. 13980, U.S.N.M.

[1] Fauna Insect German, vol. 11, p. 22, pl. 12.

[2] Ent. News, vol. 22, 1911, p. 218; Bull. Tech. Ser. No. 20, pt. 2, Bureau of Entomology, 1911; Proc. U.S. Nat. Mus., vol. 39, No. 1777, 1911, p. 117.

Genus APHILODYCTIUM Ashmead.

APHILODYCTIUM MACULATUM, new species.

Female.—Length 8 mm. Close to *multicolor* (Norton), but may be separated as follows: Middle fovea sharply defined beneath and laterally; spot on the mesoepisternum small; posterior femora brownish.

Nevada, one female.

Type.—Cat. No. 12813, U.S.N.M.

APHILODYCTIUM MULTICOLOR ERYTHROGASTRUM, new subspecies.

Female.—Length 6.5 mm. Differs from *multicolor multicolor* in the orbits being entirely yellow, and the abdomen beyond the basal plates rufous.

Male.—Length 6 mm. Differs from the typical form as the female.

Westville, New Jersey, June 6, 1897; Long Island, New York; Great Falls, Virginia, June 12 (N. Banks); Falls Church, Virginia, June 4 (N. Banks); Maryland; North fork of Swannanoa River, Black Mountains, North Carolina; many males and females taken by N. Banks flying around *Betula*.

Type.—Cat. No. 12814, U.S.N.M.

Some of the males from North Carolina have the middle of the tergum with a black line.

APHILODYCTIUM RUBRIPES NIGRITARSIS, new variety.

Differs from the typical form by the entirely black four posterior tarsi. It is also somewhat more slender. There is a superficial resemblance to *Ametastegia glabrata* (Fallén).

Steamboat Springs, Colorado. One female and five males collected May 27, 1910, by T. D. A. Cockerell. Also one female and three males from Colorado, with no definite locality. It may be that this variety will be found only in western Colorado.

Type.—Cat. No. 13982, U.S.N.M.

Genus PERINEURA Hartig.

PERINEURA TURBATA, new species.

Antennæ with an annulus; abdomen and legs rufous; head and most of the thorax black.

Female.—Length 8 mm. Labrum acutely rounded; clypeus deeply, narrowly arculately emarginate; surface granular; head rather coarsely granulato-reticulate; posterior orbits and occiput carinated; frons indicated below as in *rubi* (Panzer); pentagonal area only indicated; postocellar area poorly defined anteriorly, at least twice as wide as the cephal-caudad length; postocellar line shorter than the ocelloccipital line; pedicellum angular, the length and width subequal;

antennæ somewhat flattened, about two-thirds as long as the insect, the third joint longer than the fourth; mesoscutum shining, finely punctured; scutellum opaque, finely granular; stigma broadest at base, tapering to the apex; the third cubital cell about twice as broad at the apex as at the base, receiving the transverse radius near the apex; sheath straight above, subtruncate, rounded below. Black; labrum, seventh to the ninth antennal joints, tegulæ, apex of the coxæ and trochanters, and the posterior tarsi white; mandibles, clypeus, supraclypeal area, two basal joints of the antennæ, prescutum, scutellum, angles of the pronotum, the legs below the trochanters, and the abdomen beyond the basal plates rufo-ferruginous or ferruginous. Wings hyaline, iridescent; venation dark brown, stigma at the base white.

Male.—Very like the female. The antennæ are entirely ferruginous. The hypopygidium is broadly rounded apically. The clypeus is in some specimens nearly white.

Two paratopotypes show that the species may vary thus: The base of the third antennal joint may be pale, the white of the antennæ may not be sharply defined but shaded into brown at either end, and the mesoepisternum may have a rufous spot.

North Fork of Swannanoa River, Black Mountains, North Carolina. Three females collected in late May, 1910, by F. Sherman. Five females and seven males collected in late May by N. Banks.

Type.—Cat. No. 14013, U.S.N.M.

Paratypes in the collection of the North Carolina Department of Agriculture and in the collection of N. Banks.

Genus TENTHREDINA Rohwer.

TENTHREDINA CYLINDRICA, new species.

Related to *Tenthredo fortunii* Kirby and *Tenthredo smithii* Kirby, which from the figures seem to belong to *Tenthredina*, but does not agree in all points with the description of these species.

Female.—Length 15 mm. Labrum longer than broad, obtusely pointed, margined; clypeus arcuately emarginate, lobes obtusely rounded, head shining; postocellar area much broader than the cephal-caudad length, well defined, not as wide as the postocellar line is long; ocelli in a low triangle, the area in front of the ocelli rather swollen; middle fovea with rounded walls, open above and joining with a depression from the anterior ocellus; antennæ wanting beyond the second joints in the type; mesonotum, mesopleuræ and scutellum shining, with separate distinct punctures; scutellum strongly elevated; third cubital cell subequal in length with the first and second; sheath rather narrow, parallel-sided, the apex obliquely truncate. Rufo-ferruginous, varied with black and yellow; clypeus, labrum, mandibles (apicies piceous), most of face, lower part of poste-

rior orbits, margin of collar, posterior part of sutures of anterior lobe, scutellum, scutellar lobe, metanotum, broad band on pleuræ, metaepisternum, first and third segments of the abdomen *yellow*. Most of the lobes of the mesonotum, pectus, and base of some of the abdominal segments black. Legs yellowish, line on the four posterior femora above, black; posterior tibiæ and tarsi ferruginous. Wings yellowish hyaline, vitreous, cubital and radial cells dusky; venation dark brown, stigma and costa yellowish.

Southern China. One female.

Type.—Cat. No. 14014, U.S.N.M.

Genus MACROPHYA Dahlbom.

MACROPHYA TROSULA (Norton).

Allantus trosulus NORTON, Boston, Journ. Nat. Hist., vol. 7, pt. 2, p. 244; and other references.

Macrophya albifacies KIRBY, List of the Hymenoptera of the British Mus., vol. 1, 1882, p. 271, pl. 10, fig. 18.

Macrophya trossula DALLA TORRE, Cat. Hym., vol. 1, 1894, pl. 62. Emendation.

An examination of the type of *Macrophya albifacies* Kirby revealed no differences from *trosula* (Norton), Kirby's name is therefore considered a synonym.

MACROPHYA DYARI, new species.

Related to *Macrophya trosula* (Norton), but may be separated from that species by the following characters: Middle fovea entirely wanting; vertex without large shining areas; pleuræ and the bases of the posterior coxæ black; abdomen rufous beyond the basal plates; tarsi not black at the apices.

Female.—Length, 7 mm.

Van Cortlandt Park, New York. One female collected May 20, 1896. Named for Dr. H. G. Dyar, who collected the type. Also a female from Michigan, and one without locality label, which has the marking white.

Type.—Cat. No. 14015, U.S.N.M.

MACROPHYA NAPENSIS, new species.

Female.—Length, 6.5 mm. Differs from *pluricintella* Rohwer in the angulate emargination of the clypeus, elongate middle fovea, subfiliform antennæ, and banded venter.

Napa County, California. One female.

Type.—Cat. No. 14016, U.S.N.M.

MACROPHYA FUSCOTERMINATA, new species.

Allied to *fuliginea* Norton, but the tergum has distinct punctures and the posterior coxæ has a pale spot.

Female.—Length, 9.5 mm. Labrum truncate; clypeus broadly, deeply, arcuately emarginate; the lobes narrow and obtusely pointed;

middle and frontal foveæ well defined; antennal furrows poorly defined but present; postocellar area well defined, somewhat wider than the cephal-caudad length; head closely punctured except the area between the eyes and the ocelli, which is shining and polished; thorax with close and distinct punctures; stigma rounded below; the second and third cubital cells equal on the radius; the post-basitarsis equal in length with the following joints; sheath broadly rounded apically, concave above, convex below. Black; spot on the mandibles, the edge of the labrum, two spots on the posterior margin of the postocellar area, spot on the anterior femora and tibiæ beneath, and a spot on the posterior coxæ *white*. Wings hyaline, beyond the stigma fuscous, venation very dark brown.

Canton, North Carolina. One female collected in June, 1910, by F. Sherman.

Type.—Cat. No. 14017, U.S.N.M.

MACROPHYA ERRANS, new species.

Very close to *M. fuliginea* Norton and *fuscoterminata* Rohwer, but the clypeus is broadly arcuately emarginate, with the angles triangular and sharp; the antennal furrows are nearly complete; and from *fuliginea* it differs in having a pale spot on the posterior coxæ.

Female.—Length 9 mm.

One female from Pennsylvania, from the C. F. Baker collection.

Type.—Cat. No. 14018, U.S.N.M.

Genus TENTHREDO LINNÆUS.

TENTHREDO ELEGANTULA (Cresson).

Allantus elegantulus CRESSON, Trans. Amer. Ent. Soc., vol. 8, 1880, p. 17, male and female.

Labidia optimus var. *bigeminus* DYAR, Can. Ent., vol. 25, 1893, p. 195, female.

The type of *bigeminus* Dyar does not differ in any way from the description of *elegantulus* (Cresson).

TENTHREDO ELEGANTULA OREGANA, new subspecies.

Female.—Length 10.5 mm. Differs from *elegantula elegantula* in the black mesopectus and black prescutum.

Cowallis, Oregon. One female from the Ashmead collection.

Type.—Cat. No. 14019, U.S.N.M.

NOTES ON AFRICAN ORTHOPTERA OF THE FAMILIES MANTIDÆ AND PHASMIDÆ IN THE UNITED STATES NATIONAL MUSEUM, WITH DESCRIPTIONS OF NEW SPECIES

BY

JAMES A. G. REHN

Of the Academy of Natural Sciences of Philadelphia

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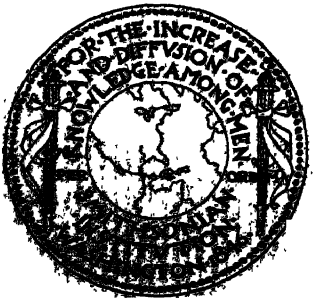

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NOTES ON AFRICAN ORTHOPTERA OF THE FAMILIES MANTIDÆ AND PHASMIDÆ IN THE UNITED STATES NATIONAL MUSEUM, WITH DESCRIPTIONS OF NEW SPECIES.

By JAMES A G REHN,

Of the Academy of Natural Sciences of Philadelphia

The following paper is based on a portion of a series of African Orthoptera turned over to me for study several years ago by the late Dr. W. H. Ashmead, assistant curator of insects in the United States National Museum My delay in bringing out this report has not been without its advantages, as the Berlin Museum recently placed in my hands for study its entire unworked series of material of the present families from central Africa, thus enabling me to secure a much more satisfactory knowledge of the subject.

At a later date it is my intent to bring together all the records which I have published relating to the series from Liberia and Luebo, Kongo, regions of the greatest interest faunistically, but for the present it seems best to make this report cover all the African material in the United States National Museum collection belonging to the two groups here considered.

For the opportunity to study this collection my thanks are due the authorities of the National Museum.

Family MANTIDÆ.

Subfamily ORTHODERINÆ.

Genus THEOPOMPA Stål.

THEOPOMPA NEBULOSA Bolivar.

1908. *Theopompa nebulosa* BOLIVAR, Mem. R. Soc. Españ. Hist Nat., vol 1, p. 458, pl. 11, fig. 2. [Kamerun.]

Luebo, Kongo. (D. W. Snyder.) One female.

This specimen fully agrees with the original description, except for the subconfluent character of the two proximal blackish maculations on the internal face of the cephalic femora, the sulcus alone dividing them.

The range of the species is considerably extended by this record.

Genus TARACHODES Burmeister.

TARACHODES WERNERI, new name.

1907. *Tarachodes perloides* WERNER. Sitzungsb. k. Akad. Wiss. Wien, Math.-nat. Kl., vol. 116, Abth. 1, pp. 192, 208, pl. 3, figs. 1–2. [Southwest Africa.] (Not of Burmeister, 1838.)

Loanda, Angola. One male.

It is evident on comparing the original description of *Tarachodes perloides* Burmeister [1] with Werner's key for the species of the genus and notes on *perloides* as recognized by him, that the latter is in error in the association of his specimens. Burmeister states distinctly, "ventre rufescente, segmentis 2-punctatis," while Werner in his key gives as one of the diagnostic characters of *perloides* "abdomen subtus immaculatum." It is quite probable that true *perloides* is the same as either *sancta* Saussure or *maura* Stål, both of which have the abdominal segments bimaculate ventrad. With the material available at the present time we can not say which of these names should be replaced by the older *perloides*. Under any circumstance *perloides* of Werner is not *perloides* of Burmeister, and a new name is required for the former. I take pleasure in dedicating the species to the author of the very valuable paper in which its characters were described and the species figured.

TARACHODES DIVES (Saussure).

1869. *Ch[iropus] dives* SAUSSURE. Mitth. Schw. Ent. Ges., vol. 3, p. 61. [Benguella.]

Loanda, Angola. (H. Chatelain.) One female.

Mossamedes district, Angola. One female nymph. [Acad. Nat. Sci. Phila.].

From this material it is apparent that Werner [2] was mistaken in referring the female specimen of this species from Benguella described by Saussure [3] to *T. perloides* Burmeister as recognized by him [4]. The specimens before me fully agree with Saussure's original description and figure and differ from Werner's figure in the more elongate pronotum, which is slightly constricted caudad. The cephalic margin of the pronotum is also more arcuate, the lateral angles [illegible] the caudal angles more decidedly truncate [illegible] the head in proportion to that of the prono[illegible] in the female than in Werner's [illegible]

TARACHODES PILOSIPES, new species.

Type.—Male; Luebo, Kongo. (D. W. Snyder.) [Cat. No. 14602, U.S.N.M.]

Closely allied to *T. dissimulator* Wood-Mason[1] from Kamerun, agreeing in general proportions and form, in the pale proximal area on the tegmina and in the pilosity of certain portions of the body, but differing in the arcuate instead of truncate vertex, in the nondenticulate cephalic coxæ, in the almost complete absence of black from the internal faces of the cephalic coxæ and femora, in the absence of blackish puncta caudad on the prosternum and also of a distinct maculation on the metasternum and in the less clearly defined proximal and completely absent distal pale areas on the tegmina.

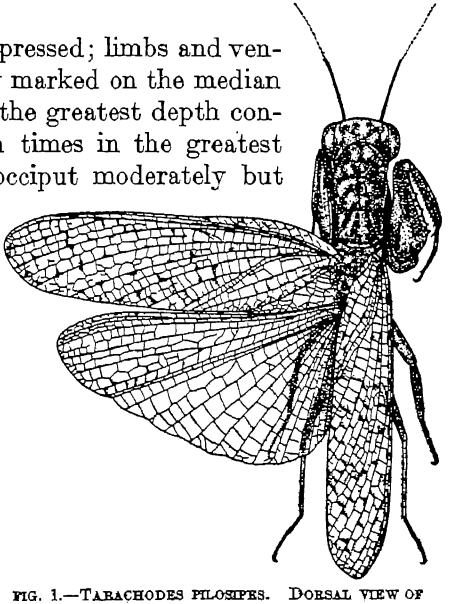


FIG. 1.—TARACHODES PILOSIPES. DORSAL VIEW OF TYPE. (× 1½.)

Size rather large; form subdepressed; limbs and ventral surface pilose, this strongly marked on the median and caudal limbs. Head with the greatest depth contained about one and one-fifth times in the greatest width; face slightly concave; occiput moderately but distinctly arcuate, the juxta-ocular sulci well impressed; ocelli moderately large, placed in a triangle; facial shield with the greatest depth contained one and two-thirds times in the greatest width, dorsal margin subtruncate mesad, slightly oblique subtruncate laterad, lateral margins subparallel, ventral margin slightly arcuato-emarginate, surface of shield smooth; antennæ simple; eyes not projecting, their outline rounding into that of the head. Pronotum with the greatest dorsal (supra-coxal) width contained slightly less than twice in the length, the width at the cephalo-lateral angles very slightly less than that of the supra-coxal region, that at the caudo-lateral angles not more than four-fifths that of the widest portion; cephalic margin strongly arcuate, slightly sinuate laterad, with a slight median truncation, cephalo-lateral angles distinctly produced, angulate, lateral margins slightly pilose, bi-undulate, narrower caudad of the coxal insertion than cephalad of the same, caudo-lateral angles rounded, caudal margin rather broadly truncate mesad, obliquely truncate laterad; surface of disk multimpressed, a more or less distinct medio-

[1] Journ. Asiatic Soc. Bengal, vol. 51, pt. 2, p. 23.

longitudinal shallow sulcus present, a well-marked transverse sulcus present at the cephalic third and subobsolete mesad, caudal third with a ∩-shaped area depressed below the level of the median section, a shallow transverse depression is present at the cephalic sixth, oblique paired depressions located meso-laterad and a transverse narrow rounded elevation borders the caudal margin. Tegmina decidedly exceeding the apex of the abdomen, the length slightly greater than three times that of the pronotum, broad, the greatest width contained about three and one-half times in the length of the same, hyaline; costal margin well arcuate proximad and distad, straight for the remainder of its length; sutural margin for the greater portion of its length subparallel to the straight section of the costal margin; apical margin oblique arcuato-truncate, the immediate apex costal in position and well rounded. Wings about five-sixths the length of the tegmina, the greatest width contained about twice in the length, apex rotundato-rectangulate. Supra-anal plate transverse subtrigonal, the apex rather deeply rotundato-emarginate; cerci distinctly surpassing the apex of the subgenital plate, depressed, slightly tapering, moniliform; subgenital plate very ample, lateral margins moderately converging caudad, apical margin truncate, styles short, simple, free. Cephalic coxæ two-thirds the length of the pronotum, robust, unarmed; cephalic femora hardly shorter than the pronotum, compressed, the dorsal portion strongly so, the greatest depth of the femur contained two and one-third times in the length of the same, dorsal margin slightly arcuate proximad, straight distad, external face broad, deplanate, with a median raised distal ridge, ventro-external margin with five short teeth, one of which is on the genicular lobe, ventro-internal margin with twelve to thirteen small teeth of two, usually alternating, sizes, discoidal spines four in number, placed well proximad and with the proximal one very small, the others [illegible] robust; cephalic [illegible] slightly more than two-thirds [illegible] with thirteen to [illegible] internal margin with four [illegible] both series [illegible] cephalic tarsi [illegible] subequal [illegible] compressed, the dorsal [illegible] and the [illegible] face

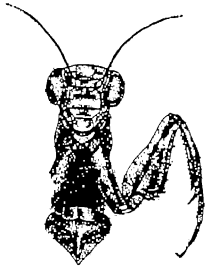


FIG. 2.—TARACHODES PILOSIPES. VENTRAL VIEW OF HEAD, STERNA AND CEPHALIC LIMB. (× 1½.)

of the caudal limbs and most of the median and caudal limbs more or less thickly and distinctly punctulate with vandyke brown. Tegmina hyaline, proximal portion subopaque cream-buff, obliquely delimited, embracing the concolorous stigma and all of the marginal field; veins cream-buff, the longitudinal ones with regularly placed sections of brown, varying from vandyke to seal brown, which at the intersections of cross-veins color the latter to or nearly as far as the spurious veins, the latter seal brown. Wings milky hyaline, slightly buffy along the costal margin, principal veins cream-buff, the principal veins of the discoidal field marked as on the tegmina, but in a weaker, more irregular fashion. Cephalic coxæ pale rose purple on the internal face, proximal extremity narrowly dark brown, the distal margin of the general color, preceded by a small brownish spot; cephalic femora weakly lined with brownish on the median keel of the internal face. Tarsi with the joints tipped with dark brown, the metasterni with three to four maculations of the same. Prosternum solidly blackish except for a short caudal unmarked section of the general color; mesosternum and metasternum non-maculate.

Measurements.

	mm.
Length of body	37.0
Length of pronotum	9.8
Greatest width of pronotum	5.5
Length of tegmen	31.0
Greatest width of tegmen	9.2
Length of cephalic femur	9.0

The type of this beautiful species is unique.

Genus GALEPSUS Stål.

GALEPSUS CONGICUS, new species.

Type.—Male, Luebo, Kongo. (D. W. Snyder.) [Cat. No. 14603, U.S.N.M.]

Allied to *G. lenticularis* (Saussure), *G capitatus* (Saussure), and *G. meridionalis* form *intermedius* Werner from South and East Africa, but differing from both the latter in the distinctly narrower and proportionately much deeper head, in the somewhat more arcuate vertex and more rounded eyes. From *G. lenticularis*, which is apparently its closest ally, it can be separated by the absence of distinct protuberances on the vertex and by the less arcuate character of the same. The form of the head in this species is quite distinctive being distinctly narrower than deep.

Size rather small; form slender and elongate, slightly depressed; surface smooth. Head slightly but distinctly deeper than wide, as is usual in the genus, fixed so that its axis is horizontal, the exposed dorsal portion of the occiput gently rounded with a pair of impressed

juxta-ocular arcuate sulci paralleling the eyes; occipital line undulate arcuato-truncate between the sulci, subarcuate laterad; ocelli placed in a triangle, the ventral ocellus larger than the paired ones; facial shield with the greatest (median) depth about two-thirds the greatest (ventral) width, the dorsal margin gently arcuate, ventral margin moderately arcuato-emarginate, lateral margins slightly diverging ventrad, surface smooth; eyes little prominent, rotundato-obtuse cephalo-laterad, gently arcuate laterad, the greatest width of the eyes contained about one and one-half times in their length; antennæ simple. Pronotum elongate rectangulate, the greatest (supra-coxal) width contained two and one-half times in the greatest length; cephalic margin well arcuate, slightly flattened mesad, cephalo-lateral angles well rounded; lateral margins cephalad of the coxal insertion subequal to the supra-coxal width, caudad of the same distinctly but not greatly narrowed, caudal margin arcuate laterad, truncate mesad; disk of the pronotum with the faintest possible medio-longitudinal sulcus cephalad, an equally faint median carina near the caudal extremity; transverse sulcus at the cephalic third, strongly U-shaped, the arms of the sulcation slightly sinuate and slightly converging cephalad; margins entire. Tegmina with the greatest length about two and one-half times that of the pronotum, slightly surpassing the apex of the abdomen, apex narrowly rotundate. Wings with the costal margin nearly straight, apex rotundato-rectangulate. Supra-anal plate transverse trigonal, angle broadly obtuse, median carina present; cerci depressed, sublamellate, surpassing the subgenital plate, apex missing, proximal joints broader than long; subgenital plate broad, proximad, lateral margins strongly converging caudad, caudal margin very narrow, truncate, styles very short, free. Cephalic coxæ equal in length to about three-fifths of the pronotal length, unarmed on the margins; cephalic femora equal to four-fifths of the pronotal length, moderately compressed, dorsal margin subarcuate proximad, straight distad, ventro-lateral margin with five spines decreasing in length distad, the distal one on the genicular lobe, ventro-internal margin with 13 spines, more or less alternating in length, discoidal spines 4 in number; cephalic tibiæ (without apical claw) about two-thirds the length of the femora, external margin armed with 10 to 11 spines, internal margin armed with 11 spines increasing in length distad; cephalic metatarsi equal to four-fifths of the tibial length, remainder of the tarsi very slightly shorter than the metatarsi. Median limbs quite slender, the femora not more than three-fifths of the pronotal length. Caudal limbs longer than the median ones, the femora but slightly shorter than the pronotum.

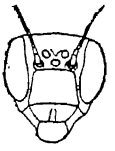


FIG. 3.—GALEPSUS CONGICUS. OUTLINE OF HEAD. (×4.)

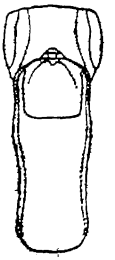


FIG. 4.—GALEPSUS CONGICUS. DORSAL OUTLINE OF HEAD AND PRONOTUM. (×4)

General color cinnamon; eyes seal brown; antennæ ochraceous; pronotum clouded with chocolate and with a fine medio-longitudinal line of the same. Prosternum seal brown mesad for the greater portion of its length. Tegmina and wings very faintly infumate, the veins lined with russet and prout's brown.

Measurements.

	mm.
Length of body	27.0
Length of pronotum	7.0
Greatest width of pronotum	2.8
Length of tegmen	19.2
Length of cephalic femur	5.2

The type is unique.

Subfamily MANTINÆ.

Genus HAPALOMANTIS Stål.

HAPALOMANTIS RHOMBOCHIR (Werner).

1908. *Entella rhombochir* WERNER, Ber. Senck. Naturf. Ges., p. 48, pl. 3, fig. 6. [No locality.]

Loanda, Angola. One female.

This specimen agrees with individuals from Kamerun.

Genus STENOPYGA Karsch.

STENOPYGA EXTERA Karsch.

1892. *Stenopyga extera* KARSCH, Ent. Nach., vol. 18, p. 146. [Barombi station on Elephant Lake, Kamerun.]

Mount Coffee, Liberia. March, 1897. (R. P. Currie.) One male.

This specimen is inseparable from a Kamerun individual. The range of this species is by this record continued northward along the coast, as the Gold Coast was the previous northern point for the form.

Genus TENODERA Burmeister.

TENODERA SUPERSTITIOSA (Fabricius).

1781. [*Mantis*] *superstitiosa* FABRICIUS, Spec. Ins., vol. 1, p. 348. [Æquinoctial Africa.]

Loanda, Angola. (H. Chatelain.) One female.

Luebo, Kongo. (D. W. Snyder.) One female.

The measurements of these specimens are as follows:

	Luebo.	Loando.
	Mm.	*Mm.*
Length of body	92.0	95.0
Greatest width of head	7.9	8.0
Length of pronotum	37.0	39.0
Greatest width of pronotum	5.5	5.6
Length of tegmen	61.0	63+
Greatest width of tegmen	8.5	9.6
Length of cephalic femur	21.0	22.0
Length of cephalic tibia	33.5	34.5

The previous exact West African records for this species are Mukimbunga, Lower Kongo, Bibunde and Mapanja, Kamerun (Sjöstedt) and Bissau, Portuguese Guinea (Griffini).

Genus POLYSPILOTA Burmeister.

POLYSPILOTA VALIDISSIMA Gerstaecker.

1883. *Polysp[ilota] validissima* GERSTAECKER, Mitth. Naturw. Ver. Neu-Vorpomm., vol. 14, p. 89. [Aburi, Gold Coast.]

Mount Coffee, Liberia. (G. P. Goll.) One male.

Clay Ashland, Liberia. (Mrs. J. E. D. Sharp.) One female.

The specimens of this striking species agree well with the original description and vary in dimensions but a millimeter or so from the type measurements. The range of the species is extended northwestward from the Gold Coast by these records, while the most southern point from which the species is known is the Gaboon country (Westwood).

The female specimen shows that there is some variation in the coloring of the internal face of the cephalic coxæ, these parts being dark brown as in the male, while in the type female they were described as blackish.

POLYSPILOTA CALABARICA Westwood.

1889. *Polyspilota calabarica* WESTWOOD, Rev. Mantid., p. 35, pl. 11, fig. 2. [Old Calabar.]

Mount Coffee, Liberia. (G. P. Goll.) One male.

This individual agrees quite well with the original description and figure except that the transverse costal tegminal bars are more regularly spaced, much as in males of *P. validissima*. The size is slightly less than that of the type, but this is apparently nothing more than individual variation.

It is quite difficult to understand why Werner[1] synonymized *Miomantis armicollis* Karsch with this species. One of the characters of this species, mentioned by the original describer, is the unarmed condition of the basal portion of the pronotum, while *armicollis*, based on the same sex (male) as *calabarica*, has the margins of the shaft with strong teeth. The range of *calabarica* is considerably extended to the northwest by the Mount Coffee record, the southern limit as far as at present known being the Kamerun.

POLYSPILOTA VARIEGATA (Olivier).

1792. *Mantis variegata* OLIVIER, Encycl. Meth., Ins., vol. 7, p. 638. [Angola.]

Mount Coffee, Liberia. February–April, 1897, and 1897 without month. (R. P. Currie and G. P. Goll.) Six males, fifteen females, one immature male.

Luebo, Kongo. (D. W. Snyder.) One male, three females.

Of the Mount Coffee series of this widespread and polymorphic species four males belong to the color form *pustulata*, two males and

[1] Ber. Senck. Naturf. Ges., 1908, p. 36.

eleven females to the form *striata*, and four females to the form *viridis*.[1] Of the Luebo specimens the male belongs to the *pustulata* form and the three females to the *striata* type.

As measurements of the above series may prove of service in studying the amount of geographic and individual variation in size in this species, I append a table of the dimensions.

	Length of body.	Width of head.	Length of pronotum.	Greatest width of pronotum.	Length of tegmen.	Length of cephalic femur.
MALES.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
March, 1897. Form *striata*	.....	7.0	17.5	5.0	44.5	13.2
1897. Form *pustulata*	.....	6.8	16.5	4.5	42.6	12.2
April, 1897. Form *pustulata*	58	7.0	18.0	5.0	42.0	13.0
1897. Form *pustulata*	.....	6.8	16.5	4.5	39.0	11.2
No date. Form *pustulata*	.....	7.0	17.3	4.5	42.0	12.2
No date. Form *striata*	.....	7.0	17.5	4.5	43.0	12.2
Average of above series of this sex...	58	6.9	17.3	4.6	42.1	12.3
FEMALES.						
March, 1897. Form *viridis* Werner	63	8.2	19.5	6.0	47.0	15.0
April, 1897. Form *viridis* Werner	61	8.2	19.5	6.0	47.0	14.5
1897. Form *striata*	58	8.2	19.6	6.0	46.0	15.0
Do	59	8.2	19.2	6.5	48.0	15.0
Do	63	8.2	20.8	6.2	49.0	16.0
April, 1897. Form *viridis*	57	8.2	19.0	6.0	47.0	14.5
March, 1897. Form *striata*	59	8.2	19.5	5.8	43.0	14.8
April, 1897. Form *striata*	64	8.5	20.5	6.5	52.0	16.5
Do	63	8.3	20.8	6.2	49.0	16.0
April, 1897. Form *viridis*	63	8.3	20.0	6.0	50.0	16.0
February, 1897. Form *striata*	62	8.3	19.5	6.1	49.0	15.2
April, 1897. Form *striata*	63	8.3	19.7	6.0	48.0	15.0
Do	61	8.2	19.5	6.0	49.0	14.5
No date. Form *striata*	.....	8.3	20.0	6.7	50.0	16.0
Do	.....	8.0	19.2	6.0	46.8	15.2
Average of above series of this sex...	61.2	8.2	19.7	6.1	48.0	15.2

Genus SPHODROMANTIS Stål.

SPHODROMANTIS LINEOLA (Burmeister).

1838. *M[antis (Stagmatoptera)] lineola* BURMEISTER, Handb. d. Entom., vol. 2, Abth. 2, pt. 1, p. 537. [Sierra Leone.]

Mount Coffee, Liberia. April, 1897, and 1897. (R. P. Currie and G. P. Goll.) Four males, five females, two immature females.

Luebo, Kongo. (D. W. Snyder.) Two females, one immature female.

Loanda, Angola. (H. Chatelain.) Two females.

My study of this and other material causes me to indorse Werner's treatment of *gastrica* Gerstaecker, *bicarinata* Saussure, *kersteni* Stål, and *christina* Kirby as synonyms of this species.[2] Regarding *rudolfæ*, however, I must differ, as it appears to represent a southern form of the *bioculata* type.[3]

As the greater portion of the above series has been in alcohol, we can not give any notes on color variation.

[1] See Werner, Ber. Senck. Naturf. Ges., 1908, p. 38.

[2] Ber. Senck. Naturf. Ges., 1908, pp. 33–34.

[3] See Rehn, Proc. Acad. Nat. Sci. Phila., 1911, p. 322.

Genus HOPLOCORYPHA Stål.

HOPLOCORYPHA PERPLEXA, new species.

Type.—Female; Luebo, Kongo. (D. W. Snyder.) [Cat. No. 14604, U.S.N.M.]

A member of the *macra-galeata* group, but readily separable on account of the more elongate pronotum, which has the lateral carinæ of the caudal half of the same irregularly undulate, and by the much slenderer cephalic limbs.

Size rather large (for the genus); form considerably elongate; surface rugoso-tuberculate. Head transverse, the greatest depth contained nearly one and one-half times in the greatest width; occipital line truncate between the juxta-ocular sulci; juxta-ocular lobes rather low, obtuse, not deplanate; ocelli very small, placed in an arcuate line; facial shield with the greatest depth contained one and one-half times in the greatest width, dorsal margin slightly arcuate, ventral margin subarcuate emarginate with a slight median indentation, lateral margins moderately converging dorsad, dorso-lateral angles rect-obtuse, ventro-lateral angles slightly acute; eyes prominent, ovoid when seen from the side; antennæ very delicate, filiform, their length but little greater than the greatest width of the head. Pronotum with the greatest (supra-coxal) width contained about six and one-half times in the length of same, the width at the caudal margin but slightly less than the supra-coxal width; collar distinctly narrower than the shaft, the average width of the former slightly less than a third the length of the same; cephalic margin strongly arcuate, slightly flattened mesad, lateral margins of shaft parallel, straight to near the supra-coxal region where the margins expand moderately to the obtuse-angulate lobes, narrowing caudad of the same, and subparallel on the entire shaft, although very slightly but regularly expanding caudad, entire lateral margins denticulate; median carina marked more or less distinctly over the entire pronotal length; transverse sulcus truncate, placed very slightly in advance of the greatest pronotal width; surface more or less distinctly undulato-lineate rugoso-tuberculate, the false lateral carinæ markedly crenulato-undulate; distinct usually paired tubercles placed along the median carina and a semielliptical line of tubercles placed caudad on the collar. Abdominal segments with the medio-dorsal lobe distinct, largest on the second segment; supra-anal plate large, subquadrate,

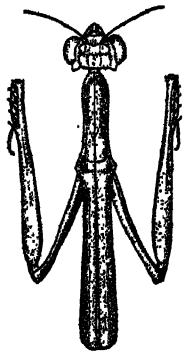


FIG. 5.—HOPLOCORYPHA PERPLEXA. DORSAL VIEW OF HEAD, PRONOTUM, AND CEPHALIC LIMBS. (× 1½.)

slightly tectate, caudal margin bisarcuato-truncate, lateral angles broadly rounded; cerci slightly exceeding the supra-anal plate in length, robust, moniliform; subgenital plate strongly compressed distad. Limbs very slender. Cephalic coxæ slightly shorter than half of the pronotal length, of the structure found in the other species of the genus, the margins very finely denticulate, the slenderest portion at the distal third, internal distal lobe strongly developed, rounded: cephalic femora equal in length to about two-thirds that of the pronotum, very slender, tapering regularly from the proximal section, hardly compressed; external margin with five spines, one of which is very small and placed on the genicular lobe, internal margin with eleven [1] to twelve spines of alternating size except distad, where from three to four small spines intervene between the terminal large spine and the one preceding it; discoidal spines three in number, the second very long and surpassing in size the apical tibial claw: cephalic tibiæ slightly less than a fourth the length of the femora, moderately compressed, armed on the external margin with four spines on the distal half, unarmed proximad; internal margin with eight to ten spines; cephalic tarsi not exceeding the tibiæ in length, the metatarsi comprising more than half of the tarsal length. Median and caudal limbs very slender and elongate; tibiæ slightly longer than (caudal) or subequal to (median) the femora; median metatarsi slightly less than two-thirds of the length of the median tarsi; caudal metatarsi about three-fourths of the entire tarsal length.

General colors mottled raw umber and seal brown. Prosternum almost uniform broccoli brown, slightly roseate caudad of the insertion of the cephalic limbs. Cephalic coxæ with their internal faces nearly uniform broccoli brown, external margin beaded with seal brown; cephalic femora with the ventral and part of the internal face solid seal brown. Supra-anal plate and cerci wood brown. Median and caudal tibiæ obscurely biannulate with wood brown proximad.

Measurements.

	mm.
Length of body	60.0
Length of pronotum	24.5
Greatest width of pronotum	3.5
Length of cephalic femur	16.5
Length of median femur	16.5
Length of caudal femur	19.0

An imperfect paratypic specimen has also been examined. It is considerably smaller than the type and, having lost the apex of its abdomen, the sex can not be ascertained. No point of difference from the type can be found.

[1] This appears to be abnormal and due to injury to certain spines.

HOPLOCORYPHA BOVIFORMIS, new species.

Type.—Male; St. Paul de Loanda, Angola. [Cat. No. 14605, U.S.N.M.]

Allied to *H. boromensis* Brancsik from Zambesia and *H. bispina* Saussure and Zehntner from Madagascar, differing from both in the extremely slender form of the pronotum and the spiniform character of the juxta-ocular lobes. From *bispina* it also appears to differ in the smaller size.

Size rather small; form elongate; surface closely and finely tuberculate. Head with the greatest depth contained one and one-half times in the greatest width; occipital outline truncate between the juxta-ocular sulci, juxta-ocular lobes rectangulate with the apices acute, mammiform, diverging, the lobes very slightly depressed; ocelli rather small, placed in an arcuate line; facial shield strongly transverse, dorsal margin truncate mesad, obliquely arcuato-emarginate laterad, ventral margin slightly arcuato-emarginate, lateral portions very narrow; antennæ slightly shorter than half of the pronotal length, simple; eyes very prominent, subglobose, ovoid in form when seen from the side. Pronotum slender, elongate, the greatest (supra-coxal) width contained nearly six times in the length; collar markedly tapering cephalad from the supra-coxal angles to the middle of the collar, thence subequal cephalad to the strongly rounded cephalic extremity, supra-coxal angles very slight but distinct; shaft slightly tapering caudad to the caudal third, thence subequal to the truncate caudal margin; lateral margins of the whole pronotum denticulate, a slight but distinct median scarina present throughout the pronotal length, transverse sulcus U shaped, not severing the median carina; paired supplementary carinæ on the shaft distinctly concavo-arcuate, closely and finely tuberculate, the tuberculations of the other (more lateral) portions of the shaft and of the collar arranged in linear fashion. Abdomen without marked mediodorsal lobes on the caudal margin of the segments; supra-anal plate with the proximal width slightly greater than the length, lateral margins arcuato-convergent caudad, apical margin bisarcuate; cerci but slightly surpassing the supra-anal plate, deplanate, moderately broad, apex acute; subgenital plate with the distal half of the lateral margins converging distad, the apical extremity very narrow,

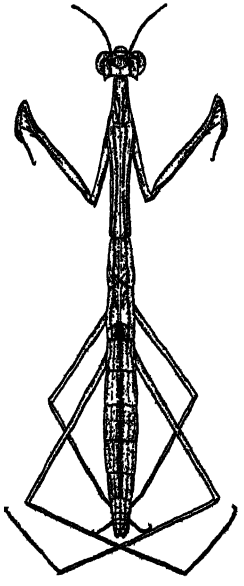


FIG. 6.—HOPLOCORYPHA BOVIFORMIS. DORSAL OUTLINE OF TYPE. (× 2.)

the very brief tuberculiform styles subcontiguous at their bases. Limbs of the slender type found in all of the species of the genus. Cephalic coxæ about half of the pronotal length, margins finely denticulate; cephalic femora about two-thirds the length of the pronotum, the distal extremity considerably curved dorsad, external margin armed with five spines, of which the distal one is on the geniculär lobe and very rudimentary in character; internal margin with twelve spines, alternating in size, except that the distal large spine is preceded by three small ones; discoidal spines three in number the second slightly exceeding the apical tarsal claw in length; cephalic tibiæ (without apical claw) very slightly more than a fourth of the femoral length; external margin armed on the distal half with four spines; internal margin with nine spines; cephalic tarsi hardly longer than the tibiæ; metatarsus comprising two-thirds of the entire tarsal length. Median and cephalic limbs very slender, the median femora about three-fourths of the length of the caudal femora; median and caudal tibiæ slightly shorter than their respective femora; caudal metatarsi comprising about three-fourths of the entire tarsal length.

General colors prout's brown and ecru drab, one lined and washed over the other. Head with the face and the proximo-cephalic portion of the eyes prout's brown finely punctulate with olive, remainder of eyes clear tawny-olive; facial shield and region immediately ventrad of the insertion of the antennæ nearly clear wood brown. Pronotum with a medio-longitudinal bar of ecru drab, slightly expanded in the supra-coxal region and regularly expanding caudad on the caudal half of the shaft, lateral portions of the shaft weakly barred in a similar direction with the same color. Mesonotum and metanotum with paired lateral lines of prout's brown, laterad of which the color is ecru drab. Abdomen with a distinct medio-longitudinal bar of prout's brown. Limbs of the general colors clouded with tawny-olive; dark punctulations and internal longitudinal bars decided on the cephalic femora.

Measurements.

	Male (type).	Female (paratype).
	mm.	*mm.*
Length of body	27.0	38.5
Length of pronotum	11.2	13.5
Greatest width of pronotum	1.9	2.3
Length of cephalic femur	7.7	10.0
Length of median femur	9.0	10.0
Length of caudal femur	10.7	12.0

I have before me a female paratype, which fully agrees with the type in all important characters, allowing, of course, for sexual differentiation in proportions. A few notes, however, may not be amiss.

Form less elongate than in the male. Ocelli very small; facial shield with median truncate portion of the dorsal margin broader than in the male. Pronotum with the proportions the same. Abdomen with very small but distinct median lobes on the dorso-caudal margins of the segments, all segments multilineate; supra-anal plate similar to that of the male in form but more tectate.

Color more uniform prout's brown, washed with ashy brown cephalad, with almost no clear ecru drab areas; pronotum without any portions of clear prout's brown; cephalic femora without dark areas on the internal faces; abdomen nearly uniform prout's brown.

Genus CALIDOMANTIS Rehn.

CALIDOMANTIS HOSIA,[1] new species.

Type.—Female; Luebo, Kongo. (D. W. Snyder.) [Cat. No. 14606, U.S.N.M].

Allied to *C. büttneri* Giglio-Tos,[2] from western, central, and southern Africa, but differing in the rotundato-subconoid eyes and the shorter tegmina and wings. It is also related to *minuta* Giglio-Tos, from the Cape of Good Hope, but it can readily be separated by the greater size of the body and the granulate pronotum.

Size rather small; form moderately elongate. Head large, the greatest width nearly twice the greatest width of the pronotum, the greatest depth of the head contained one and one-half times in the greatest width of the same; occipital outline arcuato-truncate between the juxta-ocular sulci, the portion between the sulci and the eyes distinctly arcuate declivent; ocelli small, placed in an arcuate line; facial shield strongly transverse, the greatest depth contained over three times in the width, dorsal margin narrowly truncate mesad, moderately arcuato-emarginate laterad, lateral margins arcuate, ventral margin subtruncate; antennæ simple, equal to four-fifths the length of the pronotum; eyes moderately prominent, broadly rotundato-rectangulate dorso-laterad when viewed from the front, the angle equally rounded when seen from above. Pronotum with the greatest (supra-coxal) width contained about three and one-half times in the length of the same, the collar much broader than the shaft and but little narrower than the supra-coxal expansion; cephalic margin strongly rounded with a slight median truncation, lateral margins of collar subparallel, gently expanding to the arcuate but not strongly marked supra-coxal lobes; shaft moderately and broadly narrowed, slightly expanding cephalad and caudad; caudal margin broadly truncate mesad, strongly arcuate laterad, entire lateral margins denticulate; a medio-longitudinal sulcus present for a distance

[1] Ὅσια—signifying *pious, devout.*

[2] Bull. Soc. Ent. Ital., vol. 41, 1911, p. 181.

cephalad and caudad of the transverse sulcus, which latter is well impressed; collar with a fairly complete elliptical carinate figure, which touches the transverse sulcus caudad; surface of the entire pronotum acute tuberculate. Tegmina slightly more than one and one-third times the length of the pronotum, elongate-ovate, subhyaline proximad in the sutural section, remainder opaque; costal margin broadly arcuate, slightly flattened mesad, sutural margin moderately arcuate, apex rotundato-rectangulate; costal veins numerous, stigma small, linear, placed slightly proximad of the middle. Wings about equal in length to the combined length of the head and pronotum, opaque; costal margin straight in the proximal two-thirds, strongly arcuate in the distal third, the immediate apex rounded acute-angulate, sinus distinct and moderately deep. Apex of abdomen missing. Cephalic coxæ distinctly compressed; dorsal margin with 5 to 6 teeth, between which are intercalated one or more smaller denticles; ventral face thickly denticulate, the denticulations adpressed; external margins finely denticulate; internal face of the coxæ with a few tubercles: cephalic femora slightly shorter than the pronotum, the greatest depth of the femora contained four times in the length of the same; dorsal femoral margin straight, finely crenulato-denticulate; external margin with 5 spines, of which the distal is very small and placed on the genicular lobe; internal margin with 14 spines, the distal one on the genicular lobe and the formulæ reading proximad being 1I1I1I1I1I1I1; discoidal spines 4 in number: cephalic tibiæ, exclusive of apical claw, slightly less than half of the femoral length, armed on the external margin with 7 spines placed on the median and distal portions, internal margins with 11 spines increasing in size distad: cephalic tarsi slightly longer than the tibiæ, exclusive of claw, the metatarsi slightly more than half of the entire tarsal length. Median and caudal limbs moderately slender; median femora nearly three-fourths the length of the pronotum; median tibiæ slightly shorter than the femora; caudal femora but slightly shorter than the pronotum; caudal tibiæ slightly exceeding the femora in length.

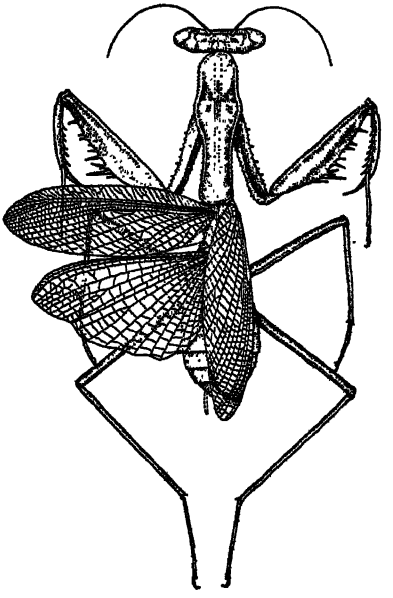


FIG. 7.—CALIDOMANTIS HOSIA. DORSAL VIEW OF TYPE. (× 2.)

General color wax yellow, becoming gamboge yellow on the tegmina and wings, head inclined toward buff; eyes clay color; cephalic coxæ non-maculate; cephalic femora with three points of seal brown on the internal face, one decidedly proximal, one larger one immediately distad of the unguinal groove and one smaller one immediately proximad of the same, larger spines on the internal margin of the caudal femora lined on the internal margin and spotted at the internal base with seal brown, all the femoral and tibial spines tipped more or less broadly with the same color.

Measurements.

	mm.
Length of body (incomplete as apex of abdomen is missing)	25.0
Length of pronotum	11.0
Greatest width of pronotum	2.8
Length of tegmen	13.8
Greatest width of tegmen	5.0
Length of cephalic femur	9.5
Length of median femur	8.0
Length of caudal femur	10.0

The type of this species is unique.

Subfamily CREOBOTRINÆ.

Genus PANURGICA Karsch.

PANURGICA LIBERIANA, new species.

Type.—Male; Mount Coffee, Liberia. (G. P. Goll.) [Cat No. 14607, U.S.N.M.]

Differing from *P. duplex* Karsch as figured by Werner [1] in having the cephalic spine shorter, the pronotum more elongate and decidedly oblique truncate lateral instead of subrectangulate and in the different shape of the lateral pronotal margin when seen from the side.

Size medium; form as usual in this genus. Head with the greatest depth contained one and two-fifths times in the greatest width; occipital line with the portion between the sulci subtruncate, juxta-ocular lobes low, rotundato-rectangulate, the angle nearer the eye than the sulcus, subtrigonal when viewed from the side; cephalic spine trigonal, depressed, distal portion slightly curved dorsad, when viewed from the dorsum the apex of the spine not surpassing the ocelli; ocelli large, subcontiguous, placed in a flattened triangle; facial shield transverse, the greatest depth about one and one-half times in the greatest width, dorsal margin with a marked median arcuate emargination, which is flanked laterad by low trigonal tubercles, the margin obliquely declivent laterad, ventral margin broadly concave, lateral margins parallel, straight, surface of plate impressed with a pair of lateral carinæ converging ventrad; clypeus subproduced dorso-

[1] Ber. Senck. Naturf. Ges., 1908, pl. 3, figs. 4*a*, 4*b*.

mesad; antennæ reaching nearly to the middle of the tegmina, moniliform; eyes strongly inflated, ovato-globose, the dorsal outline, when viewed from the lateral aspect, slightly oblique depressed. Pronotum of the usual type found in the genus, the area of greatest expansion contained about one and one-fifth times in the length; cephalic portion of margins narrowly rounded, thence laterad oblique emarginato-truncate to the portion of greatest width, caudad of this for a short distance truncate and slightly convergent, then strongly arcuato-truncate convergent to the narrowest portion, the caudal section of the pronotum with the margin broadly rounded, lateral margins serrulate; transverse sulcus strongly marked, placed very slightly before the middle, another transverse impression placed slightly caudad of the portion of least width; dorsal outline of the pronotum triarcuate when seen from the side, the central portion of the collar strongly compressed, or rather pinched, dorsad; re-entrant right angle of the lateral margins ventrad of the supplementary transverse depression decided. Tegmina very ample, nearly three and one-half times the combined length of the head and pronotum, subhyaline; marginal field narrow, distinctly narrowed in the distal half; apex of tegmina rotundato-angulate. Wings similar in texture to the tegmina and with their apices slightly surpassing those of the same. Abdomen with the proximal segments shallowly rotundato-lobate laterad, distal segments with their angles moderately acute-produced; supra-anal plate transverse, distal margin triarcuate, the median arcuation about twice as wide as the lateral ones; cerci subfusiform, moderately depressed, strongly hirsute; subgenital plate deplanate, moderately produced, distal margin rotundato-truncate, styles very short. Cephalic coxæ subequal to the length of the head and pronotum, slightly compressed; external margin serrulate, dorsal margin rather sparsely serrato-dentate, usually with smaller intercalated serrulations: cephalic femora slightly longer than the coxæ, strongly compressed, the dorsal portion sublamellate; dorsal femoral margin arcuato-truncate; ventro-lateral margin with five spines, four large, the distal one small and placed on the genicular lobe; ventro-internal margin armed with 13 spines of alternating size, the distal one of the smaller grade and placed on the genicular lobe; discoidal spines four in number: cephalic tibiæ slightly more than two-thirds the length of the femora, considerably arcuate ventrad in the distal section; armed on the external margin with 12 adpressed spines, increasing in length distad: internal margin armed with 11 spines, increasing in length distad: cephalic tarsi two-thirds the length of the femora,

FIG. 8.—PANURGICA LIBERIANA. DORSAL OUTLINE OF PRONOTUM OF TYPE. (X 3.)

FIG. 9.—PANURGICA LIBERIANA. LATERAL OUTLINE OF PRONOTUM OF TYPE. (X 3.)

metatarsi equal to half of the entire tarsal length. Median and caudal limbs with the femora lamellato-carinate on the ventro-caudal margin, this developing into a rotundato-trigonal pregenicular lobe; tibiæ appreciably constricted before the apex.

General color wood brown to russet, thickly washed, mottled and punctulate with mummy brown; tegmina and wings pale clay color, the former with a premedian touch of mummy brown, caused by infuscation along several contiguous veins, and a slight touch of the same at the distal third, the latter with the apices edged with mummy brown. Head with the face chiefly russet, the occiput and two more or less complete transverse lines, one at the level of the ocelli, the other at the upper line of the clypeus, mummy brown; antennæ russet, becoming darker distad; eyes clove brown. Pronotum with the cephalic half of the lateral portions pale, mummy brown punctulate, the remainder of the pronotum darkened, but similarly punctulate and clouded. Limbs more or less distinctly and more or less completely annulate with the two base colors, the dark areas broader than the pale areas, the latter on the cephalic limbs with dark punctulations; internal face of the cephalic coxæ and femora nearly solid seal brown, the dorsal section of the latter with fasciæ similar to those of the external face, the smaller spines on the ventro-internal margin pale, tipped with seal brown.

Measurements.

	mm.
Length of body	23.0
Length of pronotum	6.0
Greatest width of pronotum	4.6
Length of tegmen	25.5
Length of cephalic femur	8.3
Length of median femur	6.2
Length of caudal femur	7.2

The type of this species is unique.

PANURGICA FRATERCULA, new species.

Type.—Male, Mount Coffee, Liberia. (G. P. Goll.) [Cat. No. 14608, U.S.N.M.]

Allied to the preceding species but differing in the smaller size, the much less prominent and less angulate lateral expansions of the pronotum and much lower dorsal swellings of the disk of the same.

Size rather small; form slenderer than in the preceding species. Head as in *liberiana* except for the following points of difference: occipital line moderately concave, juxta-ocular lobes very low, merely rounded bosses; cephalic spine narrower and more spiniform. Pronotum of the type usual in this genus but more longitudinal than in *liberiana*, the greatest width contained one and two-fifths times in

the length of the same; cephalic portion of the lateral margins less diverging, oblique subtruncate, lateral angles very blunt, the margins regularly arcuate mesad thence to the point of least width, lateral margins finely crenulate-serrulate; caudal portion of the pronotum with broadly rounded margins which are subtruncate mesad, entire; transverse sulcus well impressed; caudal transverse depression less impressed than the transverse sulcus and not quite as evident as in *liberiana;* when viewed from the side the dorsal outline is lower and more undulate than arcuate as in *liberiana,* central portion of collar similarly compressed but less decided; rectangulate section of lateral margins similar to *liberiana.* Tegmina and wings as in *liberiana.* Abdominal segments non-lobate laterad; supraanal plate transverse, margin slightly concave over the cerci, apex rounded; cerci and subgenital plate much as in *liberiana.* Cephalic limbs much as in the preceding species, but more slender; femora with ventro-internal margin armed with thirteen spines usually alternating in size; tibiæ with thirteen external and internal spines. Median and caudal limbs similar to those of *liberiana* but the pregenicular femoral lobes are lower.

FIG. 10.—PANURGICA FRATERCULA. DORSAL OUTLINE OF PRONOTUM OF TYPE. (× 3.)

FIG. 11.—PANURGICA FRATERCULA. LATERAL OUTLINE OF PRONOTUM OF TYPE. (× 3.)

Coloration as in *liberiana* but with the pronotum less mottled and the limbs less distinctly annulate. Antennæ seal brown, pronotum washed with the same color, tegmina with a single minute spot proximad of the distal third and another extremely faint one slightly proximad of the middle; internal face of the cephalic coxæ and femora wood brown, suffused in the region of the trochanter with seal brown and along the dorsal margin of the femora with a continuation of the bands of the external face.

Measurements.

	mm.
Length of body	19.8
Length of pronotum	5.0
Greatest width of pronotum	3.6
Length of tegmen	22.5
Length of cephalic femur	7.5
Length of median femur	6.0
Length of caudal femur	6.5

In addition to the type we have before us a paratypic male, which is very slightly smaller than the typical individual but otherwise identical.

The presence of a third species of this genus at Mount Coffee is indicated by an additional broken specimen (R. P. Currie, 1897), minus head and most of the limbs.

Genus PSEUDOCREOBOTRA Saussure.

PSEUDOCREOBOTRA OCELLATA (Beauvois).

1805. *Empusa ocellata* BEAUVOIS, Ins. Rec. Afr. Amer., p. 110, Orth., pl. 13, fig. 2. ["Les déserts du royaume d'Oware."]

Mount Coffee, Liberia. April, 1897. (R. P. Currie.) One female.
Mount Coffee, Liberia. (Mrs. Sharp.) One male.
Luebo, Kongo. (D. W. Snyder.) One male, one female.
Kongo. (J. H. Camp.) One female.

The measurements of these specimens are as follows:

Locality.	Length of body.	Length of pronotum.	Greatest width of pronotum.	Length of tegmen.	Length of cephalic femur.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*
Mount Coffee, male	22.5	4.8	4.8	28.5	7.5
Luebo, male	24.5	5.5	5.8	27.0	8.5
Mount Coffee, female	27.5	5.6	5.5	25.0	9.0
Luebo, female	30.5	6.3	6.2	26.0	10.0
Kongo, female	31.0	6.5	6.5	26.5	10.5

The Mount Coffee female has the eye-spot and a large basal spot on the axillary field of the wing bright brick red.

Subfamily VATINÆ.

Genus DANURIA Stål.

DANURIA ANGOLENSIS, new species.

Type.—Male; Loanda, Angola. [Cat. No. 14609, U.S.N.M.]

Differing from *D. thunbergi* Stål, the type of the genus, and apparently from the other known forms of this group as now restricted, in having the pronotum shorter and more robust in the male sex, the length of the same being considerably less than half that of the tegmina. The lateral margins of the pronotum are dentate in their entirety, while the maculation at the apex of the internal face of the cephalic coxæ is very faint, single, and transverse in character. Comparison with the species known only from the male sex is quite unsatisfactory, but this form seems very distinct from the three species known only from that sex.

Size rather large; form robust for the male sex of this genus. Head with the median depth contained one and one-half times in the greatest width; occipital outline arcuato-subangulate concave between the juxta-ocular sulci; juxta-ocular lobes acute, conical, directed dorsad or in the line of the axis of the eyes, their height above the dorsal portion of the eyes one-third of the depth of the latter, deplanate; paired supraocellar median tubercles low, rotundato-acute; ocelli moderately large, placed in a depressed triangle;

facial shield strongly transverse, the general form arcuate dorsad, dorsal margin narrowly subtruncate mesad, arcuato-emarginate laterad of the same, ventral margin moderately arcuato-emarginate; eyes prominent, rounded, when viewed from the side seem to be pyriform-ovate; antennæ missing. Pronotum with the greatest (supra-coxal) width contained nearly five times in the length of the same, shaft two and one-half times the length of the collar; cephalic extremity well rounded, margins of collar gradually tapering from shortly cephalad of the supra-coxal insertion to the distal extremity; supra-coxal lobes but little expanded, rounded; shaft subequal in width for a distance caudad of the supracoxal lobes, thence slightly expanding caudad to the caudal margin, which is truncate mesad and obliquely arcuato-truncate laterad; median carina present on the whole shaft and the greater portion of the collar, placed for the greater part of its length in a narrow sulciform depression; surface of shaft sparsely but regularly tuberculate, surface of collar subdeplanate mesad, a deeply impressed ovate figure failing to reach the much shallower transverse sulcus, this figure strongly outlined with marginal carinæ laterad and flanked mesad with three to four distinct tubercles on each side and some scattered smaller median ones; lateral margins of the whole pronotum dentato-spinose, the spines of greatest length on the median portion of the shaft. Tegmina and wings over twice the length of the pronotum; marginal field of the former moderately wide proximad, gradually narrowing distad. Abdomen with the apex missing. Cephalic coxæ two-thirds the length of the pronotum; ventral surface sparsely tuberculate, ventro-internal margin serrato-denticulate; external margin serrulate; dorsal margin with the distal lamellation forming about one-third of the entire length, the margin of the same with eight to nine decided denticulations, the dorsal margin proximad of the lamellation arcuato-emarginate, proximal portion of the same margin serrato-denticulate: cephalic femora slightly exceeding the pronotal shaft in length, very slender, dorsal margin nearly straight with a blunt subtrigonal depressed supra-genicular projection; ventro-external margin armed with five spines, one very small and genicular in position; ventro-internal margin armed with fourteen spines placed in the following fashion (reading from the distal extremity) IIIIIIIIIIII, the distal one small, genicular and well separated from the others; discoidal spines four in number: cephalic tibiæ (exclusive

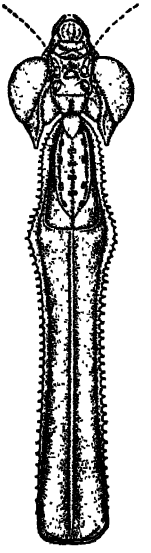


FIG. 12.—DANURIA ANGOLENSIS. DORSAL VIEW OF HEAD AND PRONOTUM OF TYPE. (× 3.)

of apical claw) about two-fifths of the femoral length, moderately compressed, armed on the external margin with eight spines on the median and distal portions, on the internal margin with twelve spines, increasing in length distad: cephalic tarsi somewhat longer than the tibiæ, the metatarsus equal to half of the tarsal length. Median and cephalic limbs slender, the femora and tibiæ moderately compressed.

General color cinnamon becoming mars brown on the tegmina; pronotum mottled rather irregularly with olive, the larger dorsal tubercles and the marginal denticulations touched with the same; region of the tegminal stigma clouded with vandyke brown; wings very strongly infumate (as usual in the genus); proximal abdominal segments broadly margined dorso-caudad with shining seal brown; cephalic coxæ washed at the proximal extremity of the internal face, along the lamellate ridge and around the insertion with seal brown, distal extremity of the internal face with the usual bar very weak seal brown and transverse in position, a narrow distal margining of the same present; internal margin of cephalic tibiæ with three poorly defined oblique fasciæ of seal brown.

Measurements.

	mm.
Length of body (minus apex of abdomen)	62.0
Length of pronotum	19.5
Greatest width of pronotum	4.0
Length of tegmen	44.0
Length of cephalic femur	15.0
Length of median femur	13.0
Length of caudal femur	17.5

The type of this species is unique.

Family PHASMIDÆ.

Subfamily CLITUMNINÆ.

Genus GRATIDIA Stål.

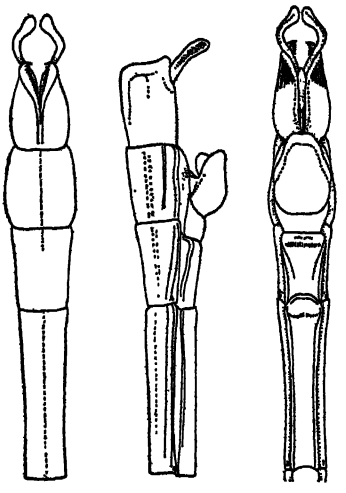
GRATIDIA PULCHRIPES, new species.

Type.—Male; Luebo, Kongo. (D. W. Snyder.) [Cat. No. 14610, U.S.N.M.]

Related to *G. kibonotensis* Sjöstedt, *insulsa, montana,* and *specifica* Brunner and *linea-alba* Rehn, but differing from these as follows: from *kibonotensis* in the subequal and straight (laterally viewed) cerci, which also project considerably caudad of the anal segment, in the less distinctly emarginate distal margin of the subgenital plate and in the far greater size; from *insulsa* in the greater size and non-carinate abdomen; from *montana* in the much longer limbs (cephalic femur 31.5 instead of 25), although the general size is about the

same; from *specifica* in the lobes of the anal segment being produced rectangulate, in the caudal point of insertion of the cerci and in the distinctly incurved form of the same; from *linea-alba* in the peculiar character of the apex of the cerci and the more inflated subgenital plate.

Size rather large (for the genus); form very elongate, limbs exceedingly slender. Head distinctly longer than the prothorax, somewhat narrowed caudad, with a very slight transverse inflation between the eyes, medio-longitudinal sulcus slight; occipital margin with a median pair of subconical tubercles; eyes subspherical, moderately prominent; antennæ seventeen-jointed, in length slightly less than half that of the cephalic femora. Prothorax with the lateral margins slightly constricted cephalad; cephalic margin regularly arcuato-emarginate, caudal margin truncate. Mesothorax slightly more than six times the length of the prothorax, very delicately carinate in all but the extreme caudal section, which is very finely sulcate. Metathorax, including the median segment, nearly equal to the mesothorax in length, very delicately carinate; median segment quadrate but very slightly longitudinal, cephalic margin very obtusely angulate, caudal margin arcuato-emarginate. Abdomen with the segments longitudinal, all except the distal ones very decidedly so, not distinctly carinate except near the apex where several lateral and a median carinæ are moderately marked; anal segment compressed, subtectate, strongly carinate dorsad, distinctly fissate for some distance, from the side the caudal margin is truncate, very slightly rounded dorsad, distinctly rectangulate produced ventrad, internally strongly denticulate, ventral line of anal segment subtruncate except for a slight arcuate emargination at the cercal insertion, which is near the caudal extremity; cerci straight (from side), subequal, slightly thickened and rounded distad, from the dorsum they are seen to be distinctly bowed and slightly knobbed at the apex; subgenital plate moderately inflated with the caudal margin bisarcuate. Cephalic femora but slightly shorter than the head and thoracic segments; cephalic tibiæ exceeding the femora by the length of the head and pronotum. Median femora equal in length to the head and pro- and mesothorax; median tibiæ some-



FIGS. 13–15.—GRATIDIA PULCHRIPES. DORSAL, LATERAL, AND VENTRAL OUTLINES OF APEX OF ABDOMEN OF TYPE. (× 5.)

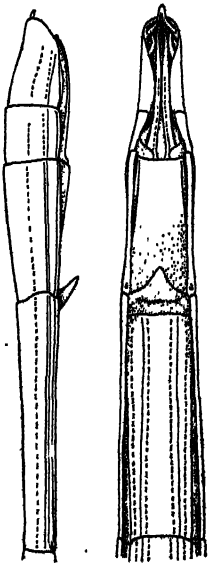
what exceeding the femora. Caudal femora equal to three-fourths the length of the cephalic femora; tibiæ exceeding the femora by more than the length of the head.

General color pale pea green, the cerci, head, antennæ and prothorax strongly washed with seal brown; limbs russet, the distal extremities of the femora seal brown, this area bordered proximad on the median and cephalic limbs by a broad irregular annulus of cream white, pads of the tarsi cream white, in striking contrast to the general coloration.

Measurements.

	mm.
Length of body	69.5
Length of pronotum	2.5
Length of mesonotum	15.0
Length of metanotum (including median segment)	14.0
Length of cephalic femur	31.5
Length of median femur	20.8
Length of caudal femur	26.0

An imperfect male specimen from the type locality has been examined in addition to the type. This individual is somewhat smaller than the type but otherwise does not differ in the essential characters.



16 17

FIGS. 16, 17.—GRATIDIA CRYPTOCERCATA. LATERAL AND VENTRAL VIEW OF APEX OF ABDOMEN OF TYPE. (× 5.)

GRATIDIA CRYPTOCERCATA, new species.

Type.—Female; Kongo. [Cat. No. 14611, U.S.N.M.]

Allied to *G. reducta* Brunner[1] from German East Africa, agreeing in the hidden cerci, but differing in the bicarinate instead of tricarinate ventral abdominal segment, much more elongate operculum, and larger size.

Size moderately large; form moderately elongate. Head slightly more than one and one-half times the prothoracic length, regularly but not very greatly narrowing caudad, interocular region hardly inflated; occipital margin with a pair of very low and weak median tubercles separated by a shallow depression of the margin; eyes subglobose, hardly prominent; antennæ imperfect, fifteen joints present. Prothorax with the lateral margins subparallel caudad, slightly arcuate constricted cephalad; cephalic margin decidedly arcuato-emarginate, caudal margin truncate; median transverse sulcus arcuate caudad. Mesothorax falling short of the length of the median femora by that of the prothorax, with the

[1] Insektenfam. Phasm., vol. 2, p. 228.

faintest trace of a median carina. Metathorax half the length of the cephalic femora, carinate in similar fashion to the mesothorax; median segment slightly transverse, cephalic and caudal margins of segment arcuate cephalad. Abdomen with all except the extreme distal segments distinctly longitudinal, a weak median carinæ and two pairs of lateral carinæ more or less distinct, but never strongly marked; anal segment, longitudinal compressed, strongly tectate, median carina distinct, caudal margin arcuate with a small but deep V-shaped median emargination exposing the small subdigitiform supra-anal plate; cerci completely hidden; operculum lanceolate, reaching nearly to the apex of the anal segment, non-carinate; seventh ventral abdominal segment margined laterad by prominent carinæ and with a distinct median pair of the same, distal margin produced into an acute-angulate roughened lobe. Cephalic femora falling but little short of the meso- and metathorax in length; tibiæ very slightly exceeding the femora. Median femora equal to about two-thirds the cephalic femoral length; tibiæ exceeding the femora by half the prothoracic length. Caudal limbs missing.

General color prout's brown, becoming wood brown on the head and more or less washed with the same color on the limbs and with écru drab on the apex of the abdomen.

Measurements.

	mm.
Length of body	77.0
Length of prothorax	2.5
Length of mesothorax	15.0
Length of metathorax (incl. med. segm.)	12.6
Length of cephalic femur	25.0
Length of median femur	17.5
Length of caudal femur	

The type is unique.